S. Sutton Rawlinson.

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Arts and Sciences;

AND

REPERTORY

OF

PATENT INVENTIONS.

CONDUCTED

BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAUGHTSMAN.

(*Assisted by several Scientific Gentlemen.*)

VOL. III.

(*CONJOINED SERIES*).

London:

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PATENT INVENTIONS.

No. XVI.

CONJOINED SERIES.

Recent Patents.

To THOMAS MOORE EVANS, *of Birmingham, in the county of Warwick, merchant, for an invention communicated to him by a certain foreigner residing abroad, for improvements in machinery for preparing and dressing flax, hemp, and other fibrous materials.* —[Sealed 10th January, 1833.]

THESE improvements in machinery for preparing and dressing flax, hemp, and other fibrous materials, apply to two distinct parts of the process of preparing and dressing such materials; namely, first, to the operation of scutching, or swingling, or beating away the boom or woody particles

of the rind which covers the flax, or hemp, in its rough state; and, secondly, to the subsequent operation of heckling, combing, or opening of the fibres of the material preparatory to spinning it into yarns; the particulars of which are exhibited in the accompanying drawing, and will be fully understood by reference thereto, and the following description thereof, that is to say:—

Plate I, represents the scutching, or swingling machine in different positions. Fig. 1, is an end view of the machine in operation; fig. 2, is a front view of the same. The essential parts of the machine, and that in which the invention especially consists, are two pairs of revolving beaters or scutchers, each formed by long ribs or blades mounted upon arms. Fig. 3, 4, and 5, represent in different positions one of the pairs of beaters or scutchers detached from the machine. The blades of the beaters *a, a,* may be made of ribs of hard wood or other suitable material, broad but thin, and slightly rounded on their edges, to prevent their cutting the fibres of the flax or hemp when they strike it. The two blades are placed parallel to each other, and mounted upon a hexagonal frame, best seen at fig 3, the arms *b, b,* inclining or forming obtuse angles with the blades, and from the middle of the arms short axles *c, c,* extend, upon which the beaters revolve.

The axles of both pair of beaters are mounted in plummer boxes, bearing upon horizontal rails at the ends of the machine, as shown in fig. 1, and are at such distance apart as will allow of the arms and the beaters of each pair passing alternately within those of the other pair as they revolve in opposite directions, which they are enabled to do without coming in contact, in consequence of the inclination of the arms.

On the axle at one end of each pair of beaters a toothed wheel *d,* is affixed, and these wheels being of similar diame-

ters, and taken into each other, cause the beaters to revolve with similar speed in opposite directions, rotatory motion being given to them by a band and rigger fixed on one of the axles; and in order that the beaters in revolving may not come in contact as they pass, the positions of the two pair are so arranged that the blades of one shall be in a perpendicular situation while those of the other are horizontal.

The rind of the flax or hemp having been previously broken by any of the ordinary modes of performing that operation, small bunches or stricks of the materials are spread out, and their ends confined between the jaws of clamps or holders.

These clamps or holders differ considerably from clamps which are commonly used. I shall therefore particularly describe their construction before showing them in operation. Figs. 6, 7, 8, and 9, are views of the clamp in different positions, *a* and *b*, are two boards united together by a hinge *c*, at top, which of course allows them to shut and open as in figs. 7 and 9. The lower parts forming the jaws of the clamps are made with teeth or indentations, between which parts the ends of the flax or hemp are securely held when the clamps are brought together; *d*, *d*, are two pieces projecting from the board *b*, at the end of each of which is an eye shown by dots, and at the back of the board *a*, (see fig. 6), there is a double armed lever *e*, turning upon a fixed pin *f*, which lever carries two circular wedges *g*, *g*. These wedges pass into the eyes of the pieces *d*, *d*, when the clamps are closed, and hold them fast. There is a segment ratchet *h*, at the upper part of the board *a*, which turns upon a stud *i*, and is pressed downwards by a spring *k*. This ratchet receives the end of the lever *e*, and consequently keeps the circular wedges firm in the eyes which hold the clamps

securely together, and prevents their opening by the shaking of the scutching machine.

When it is required to open the clamps, the ratchet *h* must be raised, and the lever *e* pushed aside by its handle *l*, which draws the circular wedges *f*, *f*, from the eyes of the pieces *d*, *d*, and the boards of the clamps immediately separate. For the convenience of suspending the holders in the machines, a piece of sheet iron *m*, is bent at right angles, and fastened to the back of the board *b*, as seen in figs. 7, 8, and 9, forming a groove by means of which the holders are enabled to slide into the machine and hang there.

These clamps or holders are, when charged with the material, placed in the scutching machine as shown at *e*, *e*, *e*, in figs. 1 and 2, bearing upon the edge rail or bar *f*. The beaters are now made to revolve in the manner already described, by which the edges of the blades will strike against the pendant stricks of flax or hemp alternately on each side, and beat off, scutch, or swingle the boom from the material, and render it fit for the operation of heckling which is to follow.

The whole machine is encased with boards, to prevent the inconvenience arising from dust, and an apparatus might be adapted with a blower to conduct the dust created by the machine, and to discharge it out of the building.

In introducing these stricks of flax or hemp into the machine, the holder is placed upon the projecting end of the bar or edge rail *f*, and is thence slidden into the machine, and after the material has been sufficiently scutched or swingled, the holders with the stricks are removed through the top of the machine, and others successively introduced at the end, and pushed along the rail.

If, however, it should be thought desirable, the stricks may be progressively carried through the scutching machine, and delivered unto a similar edge rail in the heckling machine, there to be operated upon in the way about to be described, by which means the whole process of scutching and heckling may go on without interruption.

Figs. 10, 11, and 12, represent the heckling or combing machine by which the fibres of the material are to be opened, and the tow removed. Fig. 10, is an end view of the machine; fig. 11, a front view of the same; and fig. 12, a transverse section taken nearly through the middle in a vertical direction. Perpendicular standards form the ends of the machine, which are connected together by longitudinal rods or bars secured by nuts. The heckle points intended to act upon the flax are mounted in the frames *a*, *b*, and *c*, and *d*, and the stricks of flax held in the clamps *e*, *e*, *e*, as described, are suspended from the bar or edge rail *f*, *f*, extending through the machine.

In order to render the principles of this machine and its mode of working evident, it may be desirable to show in an abstract form the manner in which the heckles are brought into operation upon the flax, and for this purpose a series of diagrams are delineated at figs. 13 to 17.

Suppose two sets of combs or heckle points be mounted upon frames *a* and *b*, as in these figures, each frame being movable by means of cranks *c*, *c*, and *d*, *d*, connected in such manner that they both turn with the same speed in opposite directions, it is evident that every part of the frames and combs will move in circles corresponding to those described by the cranks; the points of the combs travelling in the directions of the arrows, and in circles represented by dots in fig. 14. During this movement, whilst performing the first descending quarter of the circle, the cranks bring the frames together as in fig. 15. They

begin after this to separate in describing the second descending quarter, and come to the position fig. 16, when, continuing to revolve, they move further from each other in describing the first ascending quarter of the circle, and arrive at the position fig. 17, where the distance is the greatest; lastly, they describe the second ascending quarter returning to the position fig. 14. If therefore a strick of flax be suspended between the two sets of combs as in figs. 14 and 15, and the rotatory motion be continued for a sufficient length of time, the flax will be combed in the whole length which is submitted to the action of the combs, although the points severally have only operated in a very small space.

Such a system of combs or heckles would make a very good and simple heckling engine, if it were not for the inconvenience experienced by the points dragging some of the fibres with them when withdrawing from the flax, as shown in the diagram in fig. 17, which would produce a great waste of material; and to obviate this it would be neces- to introduce some contrivance for clearing the points, which must be attended with considerable complication. The plan, however, of the present improved engine, affords the means of producing the same effect by more simple and efficient means.

The principles of the improved engine are shown by diagrams in figs. 18 to 24. There are two series of combs attached to two movable frames represented separately at *a* and *b*, fig. 20. Each frame is formed by a vertical bar *b*, with lateral branches or arms, which carry the heckle points. The branches or arms are parallel, and at equal distances apart, but fixed in such positions in each frame that they may occupy the intervening spaces when the frames are brought together as fig. 18. The frames are put in motion by means of revolving cranks to which they are attached,

as shown in fig. 18; and when the cranks turn upon their axis, the branches of one frame pass between those of the other without touching. This forms what may be called a set of combs; but one of the improved machines contains two such sets, the points of the combs of one set being opposed to the points of the combs in the other set.

The way in which the series of combs that compose one set act upon the flax, is shown in the side views, figs. 21, 22, 23, and 24. In fig. 21, the cranks being nearly vertical, the points of both frames are away from the flax, but as the cranks move round in the direction of the arrows, the frames come into the position of fig. 22, and it is then that the points or heckles of one of the frames *a*, begin to penetrate the flax, and descending into the position shown at fig. 23, they comb or divide its fibres. The rotation of the cranks continuing, the two frames *a* and *b*, come into the position shown at fig. 24, the points of the frame *a*, withdrawing from the flax, and those of the frame *b*, approaching and pushing the fibres off from the former which are now combed by the descending stroke of the points.

It will hence be perceived that as the combs of the frame *a* and *b*, respectively advance, they will push forward the whole of the strick of flax, and render it impossible for the fibres to be raised and entangled as each frame in advancing clears the fibres from the points which preceded it.

A single set, however, of such combs or heckles acting only on one side of the flax, would but imperfectly perform the operation of opening its fibres; it is therefore necessary, in order to accomplish the desired object in the most effectual way, that two such sets of combs or heckles should be brought to act on opposite sides of the strick of flax, which may be done in the manner shown in the figs.

25 to 29. The cranks of the two opposite sets of comb-frames or heckles *a, b,* and *c, d,* are connected by a pair of toothed wheels *e, f,* as fig. 25, or by four toothed wheels, as fig. 26, by which the heckles are actuated at once, the two sets moving in opposite directions, but with similar speeds, and the combing or heckling of the material will go on in the way shown in the five last named figures.

Thus far I have only considered two frames of combs or heckles constituting a set as acting on each side of the strick of flax; but in order to perform a greater quantity of work, several sets may be mounted in one machine, working along side of each other, extending along the breadth of the machine. A mode of associating four sets of combs or heckles on one side of a machine, is shown in fig. 30. The combs are here supported on three frames, of which the middle one has branches or arms extending on both sides, and the other two frames branches extending inwards only. To drive the frames so arranged they must be connected to treble cranks, as shown in the last mentioned figure.

Such is the principle of the improved machine for combing or heckling, exhibited in the several figures of which I now proceed to describe the particular construction.

The machine or engine, fig. 10 to 12, has four sets of combs constructed on the plan of fig. 30, acting both at the back and front of the flax; *a, b,* are the front set of combs, and *c, d,* the back set of combs; *e, e, e,* are the clamps holding the stricks of flax previously scutched, which clamps hang upon the edge rail *f.* The comb frames are attached at top and bottom to the cranks *g, g,* which are all connected by toothed gear, as shown in figs. 10 and 11, and driven by a band and rigger *h.*

As the form and construction of the frames or heckles may not appear sufficiently evident in the representation of

the entire machine, I have given distinct figures of them, detached and in different positions at fig. 31 to 34.

The combs or heckles being put in motion in the way described, act upon the suspended stricks of flax, and open their fibres, as explained; which stricks are progressively conducted through the machine by their clamps sliding upon the edge rail *f*, through the agency of an endless chain *i*, *i*, to which the clamps are severally attached by a hook falling into one of the links. The chain *i*, is driven by a spur wheel upon the axle of the bevel wheel *k*, which receives a slow rotatory motion through a bevel pinion on the axis of a similar wheel *l*, actuated by another pinion on the end of the upper crank axle at *m*. By these means, clamps, with the stricks of flax placed on the edge rail, are slowly carried through the machine, when the flax will be gradually acted upon, first by heckle points of a coarse kind, set wide apart, and ultimately by finer points set near together; after which, the clamp with the streak of flax is discharged from the machine, at the reverse end of the edge rail. But should the workman neglect to remove the holder or clamp when it arrives at the end of the rail, the machine would be stopped by means of a jointed lever *n*, *o*, fig. 11, having a fork at its end which pushes the band from the fast rigger on to the loose one, and throws off the driving power.

As the combs or heckles in acting upon the flax to divide its fibres, tear parts of the fibres and reduce them into tow, the downward motion of the heckles brings the tow with them out of the flax, which is deposited between two fluted rollers *p*, *p*, and is by them conducted down to the large drum *q*, where it becomes lapped in two endless sheets round the periphery of the drum, the one of coarse tow, the other of fine, the adhesion being assisted by a pressing roller *r*; and when a quantity of the tow has been thus accumulated

round the periphery of the drum, it may be removed thence by cutting it off in sheets. The fluted rollers, and also the large drum, are driven by gear bands in the way shown in figs. 10 and 11.

After the strick of flax has been thus carried through the scutching machine or the heckling machine, the jaws of the clamps are to be opened and the ends of the flax reversed, and the strick again confined in the clamps, so that the other end of the strick may be operated upon in a similar way. In order to prevent any part of the flax from attaching itself to the branches of the movable frames, each frame is furnished with a shield or guard of polished iron or brass plate, which covers a part of the combs and the heads of the screws by which they are fixed to the branches. These cases are represented detached in different views at figs. 35, 36, and 37. When the plate metal is bent into the form of the shield shown at fig. 36, it is slipped on to the branches of the heckle frames, and is sufficiently elastic to hold fast on, as at fig. 37, which figure shows how the shield covers the combs.

But it is to be observed, that the edges of the shields are to vary in the extent of their projection according to the situations in which they are to be placed; those which are to shield the upper branches of heckles are to project but little, so as to leave the points uncovered and free to enter the strick of flax; but the shields of the lower heckles are to project considerably over the points, to prevent them from penetrating too far into the fibres, which is so contrived for the purpose of facilitating the falling of the tow, which would otherwise be with difficulty removed from the lower combs, if it were thrust upon the whole length of the points.

It being advantageous that each strick of flax should be combed near the lower extremities before the middle is

acted upon, it is necessary, in order to obtain this effect, to remove some of the points of the combs in the upper branches. By these means, the operation of the heckles upon the flax begins and proceeds gradually, and leaves at the opposite extremity of the machine in the same gradual way, which is very advantageous in clearing completely the flax from the tow.

Having described the principles and construction of my improvements in machinery for preparing and dressing flax, hemp, and other fibrous materials, I desire it to be understood, that I do not claim the separate and distinct parts of the said machine, but the contrivance, arrangement, and adaptation of the whole to the purposes above described.—[*Inrolled in the Rolls Chapel Office, July,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To ROBERT HICKS, *of Conduit Street, in the parish of St. George, Hanover Square, in the county of Middlesex, surgeon, for his having invented or found out an economical apparatus or machine to be applied in the process of baking, for the purpose of saving materials.*—[Sealed 26th June, 1830.]

THIS invention is stated to consist in the combination of an oven for baking fermented dough into bread, with a conducting pipe and refrigerator or condensor, which shall receive and condense the steam and alcoholic vapour emitted from the bread while baking. There is no peculiar feature of novelty in the form or construction of the oven, excepting that it is proposed to be of iron, and to have an outlet at the top for carrying off the steam and vapour.

It is particularly expressed, that the invention applies solely to the baking of *fermented* dough, and not to the baking of other kinds of dough, as biscuits and pastry, which have not been fermented.

The construction of the oven proposed by the Patentee, is shown in section in Plate II. fig. 10. *a, a*, is the brickwork forming the outer casing of the furnace and flues, *b, b*, is a close box of iron, of an elliptical shape, which is to constitute the oven. This is supported by the edges of the bottom plate bearing upon the rim of brickwork *c, c, c*.

The fire is not to be placed within the oven, but in the furnace *d* below, and the oven is to be heated by the flame and smoke passing upwards from the furnace to the under surface of the bottom plate, and through the apertures in the rim of brickwork *c*, to the channel round and over the top of the oven, from whence the smoke ultimately escapes by a chimney.

A shield *e*, is suspended from the bottom plate over the centre of the furnace, in order to prevent the heat of the fire acting with too great a degree of intensity in the middle of the oven. By means of this shield, the heat is more equally distributed over the bottom of the oven.

The bottom of the oven is covered with fire bricks *f, f*, and dough is introduced into the oven, and removed from it when baked into bread at the door *g*, which, when closed, is intended to be air tight at its joints. The steam and vapour as it arises from the baking dough, ascends into the recess *h*, and passes off by the pipe *i, i*, to a refrigerating worm in the tub *k*, where the vapour becomes condensed, and may be drawn from the worm by a cock at its lower extremity.

In order to ascertain the temperature of the oven, a thermometer *l*, is inserted in a tube, extending downwards from the top of the recess *h*, and it is stated that the pro-

per heat of the oven when in operation, should be from 280° to 310° Fahrenheit.

The fuel is to be fed into the furnace, and ignited through the ash pit *m*. It is proposed, that a basket grate be employed, and that it be slidden in and out upon the horizontal bar *n*, the air being supplied to support its combustion from the opening in front of the ash pit.

Another mode of supplying the furnace with fuel, and of heating the oven, is proposed, which is, by carrying the furnace round under the oven upon a rotatory horizontal frame made to revolve by means of bevel gear beneath, in a similar way to Brunton's plan of constructing furnaces for steam engines, and feeding them with fuel from a hopper.

It is however to be observed, that any peculiar construction of furnace or oven forms no part of this invention, but that it consists solely in connecting an oven for baking fermented dough with a refrigerator, by a pipe which shall conduct the steam and alcoholic vapours from the oven to a refrigerator, there to be condensed into a diluted spirit, which may be employed by the rectifier for the production of a pure spirit.

The Patentee closes his Specification, by saying, that he claims to be the inventor of "an economical apparatus or machine to be applied to baking, consisting of a combination of an oven for baking fermented dough into bread, with a conducting pipe leading to a refrigerator or condensor, for the purpose of saving and collecting the liquid materials which are evolved from the dough during the process of baking, whatever may be the kind of metal or substance of which the oven is made."—[*Inrolled in the Petty Bag Office, December,* 1830.]

We subjoin the following remarks upon the above invention, extracted, by permission, from a work by James Jennings,

Esq. now in the press, entitled, "The New Family Cook," in which, under the article *bread*, the author says :—"Concerning the heat necessary to be employed in an oven for baking bread, (which is said to be 450° as usually practised by bakers), it may here be observed, that if what is stated in the Specification of Hicks's Patent be true, and we see no reason to doubt it, it is evident that the degree of 450 is by far too much. It must be remembered, however, that when an oven is heated to this high temperature, the fire is wholly withdrawn, and consequently from the moment of its withdrawal, the heat gradually declines; but, in the baking of metropolitan bread, as practised by the company formed under this Patent, the heat is we presume constantly kept at the same degree or nearly so, and consequently insures not only a more complete baking of the bread than in ordinary ovens, but the most effectual disengagement of the alcohol, &c. We see every thing to commend in this process, and recommend this plan of the equalization of heat during the whole time that the bread is in the oven to the attention of bakers generally."

The author adds, on the subject of kneading—"From what has been observed, concerning the *metropolitan* as well as *French bread*, we are decidedly of opinion that the ordinary bread every where to be met with in this country is too *much kneaded*, and in consequence is less raised than good and wholesome bread ought to be. It is evident that if bread be kneaded just before it is put into the oven, as ordinary bread is, by rolling as well as otherwise, some of the gas to which its porousness is owing must escape; while, on the contrary, the French bread, and we conclude the metropolitan bread, being baked in tins, does not undergo the last process of kneading and rolling, which common bread does; and hence, the superior wholesomeness

of these breads when well baked, to the ordinary bread of the shops.

"It is not meant by these observations that the dough is not to be kneaded at all, far from it: when the water and other ingredients necessary for forming the flour into dough are added, the mass should be well kneaded in order to their complete mixture; but afterwards, when the fermentation has begun, all further kneading should as much as possible be avoided: where spirit is to be obtained from the bread, this is of the utmost importance."

To JOHN LIHOU, *of the Navy Club House, New Bond Street, in the county of Middlesex, Esq. for his invention of an improved method of constructing capstans.* —[Sealed 10th January, 1832.]

THE object of the inventor is to construct a capstan capable of exerting great power in raising the anchor, and which may be worked by a smaller complement of men than ordinary capstans or windlasses—a matter of very great importance on ship-board in boisterous weather, when all hands are called into requisition to manage the rigging.

The following is the Specification, to which no drawings are appended:

"The nature of my said invention is to facilitate the use of capstans on board ships and other vessels; and which said invention is more particularly applicable (though not exclusively) to capstans with two bodies, commonly called double capstans, as the same are used on board the larger description of ships and other vessels; and the manner in which my said invention is to be performed with reference to such double capstans, is as follows:—

I use a strong horizontal bevel-toothed wheel, made of iron, or other suitable material, which is to be firmly secured on the drum head of the lower body, or on the lower body, as hereinafter is mentioned. By the word "body" I mean the barrel, with the whelps attached thereon. The diameter of the said wheel should not be less than the usual diameter of the said drum head, but as much larger as it can be conveniently made, without being in the way of the men, when engaged about the duties of the ship. This wheel is to be actuated by a suitable pinion made of iron or other suitable material, or by two or more such pinions, which are to be worked independently of each other. The diameter of each of the said pinions may be generally made equal to about one-fourth, one-fifth, or one-sixth of the diameter of the said horizontal wheel, more or less; the particular dimensions of such pinions being adapted to the production of the power to be derived therefrom; the axle or axles of the said pinion or pinions being placed in a horizontal position, and supported or retained by and between suitable frames or braces made of iron, or other suitable material, attached to the beams or carlings of the deck, immediately over the said pinion or pinions, by which arrangement the space below the said pinion or pinions will be kept quite unoccupied and unincumbered for the ordinary duties of the ship.

The said pinion or pinions are to be thrown in and out of gear when required, by any one of the well known mechanical contrivances commonly used for such purposes, and may be actuated by hand or by any other means.

When the said pinions are to be worked by hand, there is to be attached to the axle of each of the said pinions a strong crank handle or winch handle, or a series of crank handles or winch handles, whichever shall be found most convenient, according to the number of the men required

to work the same. The axle of the said crank handles may be entirely supported by frames or bearings, attached to the beams or carlings of the deck above (as already described for the axles of the pinions), or the said axles of the crank handles may be supported by the deck stanchions; the pinion or pinions being so placed as to work in a fore and aft, thwartship or other direction, as will be most convenient for working. For this purpose, in vessels of war I recommend that two pinions be used, and so placed as to be worked, one afore, the other abaft, the said lower body in midships; which positions will be found to interfere least with the men employed about the duties of the ship.

The axle of the said pinion or axles of the said pinions and crank handles must be respectively placed at such a height from the deck on which the said lower body revolves, as will enable the men to work the cranks to the greatest advantage; and the drum head of the lower body must be placed at a suitable height from the same deck accordingly; and, if the drum head of the lower body be too high to admit of the before mentioned horizontal wheel being fixed upon the drum head, at a suitable height between decks, for the axles of the pinions to be properly placed for working the crank handles to the greatest advantage, in that case the said drum head may be entirely removed, and the said horizontal wheel is to be fitted to bind the lower body together instead of the said drum head, the centre part of the said wheel forming a suitable and efficient drum head (which may be furnished with bar holes if required), thus leaving more room for the messenger to pass round the whelps, than if the drum head had been lowered.

In this capstan, I use a spindle of wrought iron, or other suitable materials, which said spindle is firmly connected

or attached to the upper drum head and upper body with which it revolves in its bearings; but the lower part of the said spindle is to be perfectly round, and to turn freely in the centre of the lower drum head and lower body; but, when it is required to connect the said lower body with the spindle and upper body, I propose to use a clutch moving up and down on the said spindle. This clutch may be easily put in and out of gear by means of a lever or any other similar well known contrivance, but this is no part of my invention.

By the foregoing arrangements it will be seen that the lower body being attached to the spindle by means of a clutch, the upper and lower bodies may be worked by means of my said horizontal wheel and pinions, without the use of the capstan bars, or the capstan bars may be used in the ordinary way at the drum head of the upper body, at the same time that the wheel and pinions below are being worked, in which case the power acquired by the machinery, and the power acquired by the bars will be combined, and the power of the capstan in both bodies will be thereby materially increased; or the pinions may be withdrawn or thrown out of gear, as above described; and thus, both the upper and lower bodies worked entirely by the bars in the drum head of the upper body, as in the ordinary mode of using capstans. Also, by lifting up the clutch and detaching the lower body from the spindle, the lower body may be worked by means of the said wheel and pinions, while the upper body and the spindle remain stationary, or the upper body may be worked by the capstan bars in the ordinary way, and the lower body can, at the same time, be worked by means of the wheel and pinions in the same direction, and at a different velocity from that of the upper body, or the upper and lower bodies may be worked at the same time in contrary directions, whereby the said

double capstan may be made to perform the office of two separate and detached capstans, or unite their powers, without the inconvenience of applying bars to the drum head of the lower body; and by these means the use of capstans is very materially facilitated.

When the said pinions are actuated by hand, I propose as a greater security to the men working the crank handles, to increase the number of times which the capstan shall paul or catch during each revolution; for this purpose, I recommend that the hanging pauls shall be eight in number, and that there should be eighteen stops or catches for the same; half the said number of pauls to be of one equal length, and the remaining half of another equal length, in order that the capstan may paul thirty-six times during each revolution; but this is no part of my invention.

The above described method of fitting a double capstan may, in many cases, render the upper body unnecessary. In every such case, a double capstan may be converted into a single capstan by merely removing the upper body, and either letting the spindle through the deck below (as is usual in single capstans), or by cutting it off even with the deck above; I therefore do declare, that my claim extends to the adaptation of my said invention to single capstans, as well as double capstans, whenever the former are situated between the decks of a ship; and further, single capstans may have the advantage of my said invention, by fixing the above mentioned horizontal toothed wheel securely to the spindle below the deck on which the said capstan revolves, so as to be worked by a pinion or pinions as hereinbefore described, and such single capstan may be situated either on the upper deck or elsewhere; I therefore claim the exclusive privilege of constructing capstans with the horizontal toothed wheel attached to the drum head, or fixed to the top of the body, or to the spindle of capstans

and worked by means of pinions applied in the manner hereinbefore described.—[*Inrolled in the Petty Bag Office, March,* 1832.]

Specification drawn by the Patentee.

An ingenious mode of hanging the rudder of a large ship was also invented by the Patentee, (see Vol. IV. of our Second Series, page 64), which appears to have been approved, and very extensively adopted by the Navy; and we understand that the Admiralty have promoted the inventor to a Captaincy in consequence.

EDITOR.

To ALEXANDER CLARK, *of Bagilte, in the parish of Holywell, in the county of Flint, North Wales, engineer, for his invention of certain improvements in blowing machines.*—[Sealed 17th January, 1833.]

THESE improvements in blowing machines consist in modifications of the well known rotatory fan blowing apparatus employed for winnowing corn, for blasting furnaces, and for other purposes; which improved modification of apparatus is constructed on a small scale, in a portable form, for domestic and other uses, to be worked by hand.

In the accompanying drawings, [see Plate II, fig. 6,] is a section of the apparatus taken longitudinally, showing its internal construction; fig. 7, is an external view in the same direction; fig. 8, represents the reverse side; and fig. 9, is a horizontal or top view.

The outer casing or box *a, a, a,* must be so formed as to allow a wheel with fans *b, b, b,* to revolve within, the air being admitted into the box through apertures *c,* in the sides, made concentric with the axle, and expelled from the box by the centrifugal force of the rotatory fans, through a

contracted tube or nozzle *d*. The means by which I prefer to give rotatory motion to the fan, is by mounting a wheel *e*, upon an axle bearing in or attached to the casing or box, the periphery of which wheel, as it revolves, runs in contact with a pinion *f*, fixed on the end of the axle of the fan wheel, and by the friction of contact between the two surfaces, the wheel *e*, causes the fan *b*, to revolve with considerably increased velocity.

The wheel *e*, is turned by a winch or handle, and to prevent noise, I cover its periphery with a band of leather attached by cement, or by any other convenient means; and in order to accommodate any slight irregularity in the periphery of the wheel *e*, it is proposed to support the end of the axle of the wheel *b*, in a vertical lever *g*, which is pressed forward by a spring *h*, and by these means the pinion *f*, is at all times kept in contact with the periphery of the driving wheel *e*.

The Specification concludes thus:—Though I have proposed to drive the fan by friction, I do not intend to confine myself to that mode, as a toothed wheel *e*, and pinion *f*, may be employed in the same situations, or the fan may be driven by a band and pullies. I have shown a wheel *b*, with radial fans, which I consider best suited to the purpose, but I do not intend to confine myself to radial fans, as spiral or oblique fans might be found to answer the same purpose.—[*Inrolled in the Rolls Chapel Office, July*, 1833.]

Specification drawn by Messrs. Newton and Berry.

To George Rudall *and* John Mitchell Rose, *both of the Piazza, in the parish of St. Paul, Covent Garden, in the county of Middlesex, flute manufacturers, and copartners, for their invention of certain improvements on, or in the construction of flutes.*—[Sealed 27th November, 1832.]

These improvements have for their object, a mode of elongating or contracting the flute, for the purpose of varying the pitch or tune of the instrument, and of shifting the situation of the cork or stopper simultaneous, and in due proportion to the increased or diminished length of the flute, when so adjusted; by which contrivance the flute may, with the utmost facility, be brought into unison with another instrument, the tune of which may happen to be either above or below concert pitch.

The objects of the improvement above described, may be effected by different mechanical means, applied either within the flute or externally. The mode which we find best suited to the purpose, is shown in the accompanying drawings (see Plate II), where fig. 1, represents a portion of a flute, to which the improvements are adapted; fig. 2, is the same, shown partly in section, for the purpose of exposing to view the internal sliding tube; fig. 3, is a further section of the same, the tubes being cut longitudinally through the middle to exhibit the mechanism by which they are to be moved; fig. 4, represents a shaft with two screws *a*, and *b*, the threads of which pass round the shaft with different degrees of obliquity: that is to say, the one is a quick, the other a slow screw.

The disc *c*, is to be securely fixed by a pin to the upper end of the shaft as a thumb piece, by which the shaft may be turned round. Fig. 5, exhibits the screw shaft and its

appendages, connected together and attached to the sliding tube *d, d,* and to the cork or stopper *e,* but shown in this figure detached from the flute. The same parts will be seen in section, and in their working positions within the flute, in fig. 3,

At the upper end of the top joint of the flute, the fulcrum piece *f,* is fixed by pins passed from the outside. Through a central hole in this fulcrum piece, the neck or upper end of the screw shaft *a,* protrudes, and the shaft is held in that situation by the disc *c,* being pinned or otherwise fastened on to its end, as before described, which allows the screw shaft to turn round freely when moved by the thumb piece *c.* In the upper end of the sliding tube *d,* a screw box *g,* is securely fixed, and through this box the shaft passes, and in it the quick screw *a,* works; hence on turning the shaft, the screw box *g,* and sliding tube *d,* will be moved upward or downwards, and the flute consequently be shortened or elongated.

The cork or stopper *e,* has a bridge or disc *h,* fixed within it, with a hole in the centre, in which the slow screw *b,* works, and as the shaft is turned to move the sliding tube up or down, the cork or stopper is simultaneously moved also, nearer to or further from the mouth hole, a certain distance proportionate to the varying length of the flute, so as to regulate with great accuracy the pitch or tune of the instrument. A cap *i,* having a milled edge may be affixed to the disc or thumb piece *e,* for the convenience of turning the screw shaft, by which the whole of the working parts will be concealed from view.

A rib *k,* is placed on the side of the tube for the purpose of guiding the tube *d,* as it slides, and preventing its turning round; but that object might be effected equally well by placing a guide elsewhere. It may be desirable to add, that the threads of the screw shaft *a,* and *b,* should be so

formed, that while the tube *d*, is slidden a distance of one inch and a quarter, the cork or stopper *e*, should be moved a distance equal to three-sixteenths of an inch, or thereabouts.—[*Inrolled in the Rolls Chapel Office, May*, 1833.]

Specification drawn by Messrs. Newton and Berry.

To Robert Hicks, *of Wimpole-street, in the county of Middlesex, surgeon, for his invention of certain improvements in culinary apparatus.*—[Sealed 6th July, 1831.]

The object of this invention is to roast meat by the heat emitted from the flame of ignited gas, that heat being confined under a conical cover which is placed as a screen above a circular burner, and the meat to be cooked is mounted upon a vertical spit in the center of a circle of gas flame.

Plate II. fig. 11, represents one of the apparatus, the gas burner, and the conical cover being shown in section. Several of these apparatus of different sizes are proposed to be adopted to a table or dresser in a kitchen, and it is deemed most advisable that the dresser should be placed within a recess for the purpose of confining the heat, and that a pipe from a hood above should take off the steam and other vapour into the kitchen chimney or into the open air.

A chain *a*, is passed over a pulley above fixed in the cieling, if convenient, from one end of which chain the conical cap or cover *b*, is suspended, and at the other end of the chain a balance weight is attached.

A pipe *c*, conducts the ordinary illuminating gas and

from the upper side of this pipe any desired number of branch pipes, as *d*, may lead off.

These branch pipes, furnished with stop cocks, are intended to pass through a dresser or table, as *e*, and above the dresser the pipe divides into arms which conduct the gas to the annular burner *f*, *f*, the burner having perforations cut round its outer rim.

A rod *g*, is placed perpendicularly in the centre of the burner, upon which a joint of meat intended to be roasted may be spitted, and a bason or dish *h*, is also mounted within the ring to receive the dripping and gravy, which may be allowed to run off through a pipe into a basin *i*.

When the meat to be roasted has been thus spitted, and the gas in the circular burner lighted, the conical cap or cover is then let down over the meat, as shown in the figure, which confines the heat of the flame, and the reflection from the inner surface of the cone roasts the meat in a very equal and perfect manner.

In order to baste the meat without removing the cap or cover, a perforated dish or colander *k*, is made in the upper part of the cone, into which the fat or other basting materials may be introduced by a broad funnel *l*, extending on the outside of the cone; the dripping for basting being taken by a spoon from the basin *i*, and poured into the funnel *l*, as it may be required.

The Patentee says, in the conclusion of his Specification, I claim as my invention the improvements hereinbefore described, as applied to culinary purposes, and such my invention being, to the best of my knowledge and belief, entirely new, and never before used, &c.—[*Inrolled in the Inrolment Office, January*, 1832.]

To Moses Teague, *of Park-End iron works, near Calford, in the county of Gloucester, iron-master, for his having invented certain improvements in making and smelting pig iron.*—[Sealed 17th January, 1832.]

The Patentee states that his improvements consist in "making use of or employing the flame and heat (heretofore discharged into the open air) from the tops or tunnel heads of blast furnaces or cupilos, used for the making and smelting of pig iron; by means whereof, the said flame and heat is made to act upon the ores, mines, and minerals about to be smelted, previous to the same being deposited into the interior of the furnace or cupilo. The material is hereby acted upon with additional heat, which would otherwise pass away without producing effect, and the preparation for smelting so much forwarder as to require considerably less fuel, blast, and time in the operation.

The method of applying the same is by diverting the flame and heat (usually passing out of blast furnaces, or cupilos, into the open air), and causing the same to pass in, upon, or through one or more ovens, stoves, buildings, or erections to be fixed in, or upon, or near to the tops or tunnel heads of the said furnaces or cupilos; which said ovens, stoves, &c. &c. are made to contain certain portions, quantities, or charges of the materials, previously deposited therein for the purpose of being smelted, the heat and flame so diverted being made to act thereon.

The said flame and heat diverted from its usual course, and driven or discharged into or through the said ovens, stoves, &c. &c. by partially contracting or stopping up altogether the tops or tunnel heads of the said blast, furnaces, or cupilos, either permamently with brick-work, mason's-work, or any other mode, or by one or more move-

able dampers, doors, or valves, to be fixed on, in, or upon them, or the said ovens, stoves, &c. &c. By this means the flame and heat is diverted and caused to pass into or through the ovens or stoves, which have one or more chimnies or flues attached thereto, in order to carry off the superfluous heat, flame, and sulphur.

The shape, size, and number of the said ovens, stoves, or chambers for containing the ore, mine, or mineral, might be varied according to the size of the furnace, or cupilo, and the quantity of materials used in each load or charge; but the more surface can be obtained (provided a sufficient quantity of heat and flame can be brought to act thereon) the better, as the materials to be smelted can be more thinly spread, and, consequently, present a greater surface to be acted upon by the said heat and flame.

Subjoined are drawings which will afford every facility to any experienced workman, so as to enable him to construct the stoves, or chambers, chimnies, and dampers, on the principle claimed under my Patent, which may, nevertheless, be varied according to situation and circumstances.

Plate II, fig. 12, is an elevation or front view of the furnace; *a*, is the tunnel head, or top of an iron furnace, the interior of which is closed by a moveable damper or fixed arch of brick-work, which is shown in the section, fig. 13, at *b*, *b*, the feeding hole closed by a damper, through which the charcoal, coke, coal, or any other fuel is put into the furnace; which damper or door is made of cast iron, or any other material that will stand heat, and is elevated or depressed by means of a lever and weight.

Two of the four openings into the stove are shown at *d*, *d*, into which the ore or other substances are deposited, to be acted upon by the flame before it escapes up the flue or chimney *e*, *e*. These openings are shown closed with

their respective dampers, which are to be raised by levers when the ore and other substances are to be deposited in the stove; *f*, shows the damper on the top of the flue or chimney, which serves to regulate the draft.

Fig. 13, is a section, exhibiting half of the interior of the tunnel head *a, a,* the aperture of which is closed by means of the damper *b*. The stove is shown at *c*, through which the flame is made to circulate, and act upon the mine or ore, and other substances deposited on the plate or bottom *d*. Fig. 14, is a plan of the aperture or top of the tunnel head below the damper, out of which the flame and heat is diverted in one body or volume in a circular direction through the stove, and up the flue or chimney; *d*, is the tipping plate before the loading door; *e, e, e*, are piers on which the arch forming the roof of the stoves rest.

Fig. 15, is an elevation; *a*, the tunnel head, with four stoves in communication therewith, two of which *c, c*, are only externally visible. These are represented with closed apertures; *d, d, d, d*, are the four flues or chimneys, through which the heat and flame passes from the four stoves. These chimneys have also dampers.

Fig. 16, is a section showing the interior of one of the stoves in connexion with the interior of the tunnel head; *a*, the stove; *b*, the flue or chimney; *c*, the shelf or bottom, on which the mine or other substances are laid; *d*, the interior of the tunnel head, from which the flame and heat is diverted. Fig. 17, is a plan of the bottom of the tunnel head; *b, b, b*, the bottom plates of the stoves on which the mine and substances are placed, to be acted upon by the flame and heat; *c, c, c*, are partitions of brick or stone, which separate the stoves, and support the roof, &c.

If it is required, the furnace may be made to act with the chimney only, and a damper thereon to regulate the draft. By this means a considerable saving may be made

in blast, which, according to the height of the chimney, may be diminished in proportion to the extent of the draft.—[*Inrolled in the Inrolment Office, July,* 1832.]

Specification drawn by the Patentee.

ON THE PROPOSED NEW LAWS,

For the protection of Patentees.

In the draft of the Bill for amending the Laws relative to Patents for inventions, as given in our last, will be found that fragment of the subject proposed to be enacted before the expiration of the present Session of Parliament; the other parts of the Bill remaining for future legislation. Subsequently to printing the Bill in the form then set out, some very necessary loppings off and other alterations of clauses have taken place in the House of Commons, which have certainly improved it, but the Bill is not yet in that state in which it ought, or indeed can be, allowed to pass into a law.

We have done our utmost by unwearied application to lead the attention of the members of the lower House, both in and out of committee, to such points as even in the last amended state of the Bill, we consider to be impracticable, or likely to be injurious to public interest; we have partially succeeded, but not to the extent of our wishes. We are however not without hope, that in the House of Lords further amendments may be effected, and when that is done, Patentees may congratulate themselves

on having obtained at least some points of real importance, a legal and rational protection to Patent property, which the old laws did not afford.

The Bill, as passed by the House of Commons, confirms the clauses I. to XVII., nearly as they stand in the draft copy given in our last, with the exception of clauses II. and XIII., which are very properly struck out altogether.

After clause I, the following is added: "And be it further enacted, that any person introducing for the first time, from places out of His Majesty's dominions, any new invention, such person shall for the purposes of this act be deemed and taken to be an original inventor."

In clause III., stating what shall be considered a previous knowledge or prior use of an invention, after the words "used in a public manner," is added, "and not merely by way of experiment" within ten years, &c.

At the latter part of clause V, after the words, "shall find such Specification was erroneous, defective, or insufficient in description," the following—"only from too extensive a claim of invention, or from inadvertency," is struck out. And at the end of the clause, in reference to amending the title or Specification, is added, "of which notice shall be given twice in the London Gazette." But why may not a Specification be amended, if necessary, without going to a jury?

Between the fifth and sixth clauses is introduced a new one, in these words:—

"Provided always, and be it enacted, that the provisions of this act shall not extend or be construed to extend to any Letters Patent to uphold which, or for the infringement of which, any suit or suits at Law or in Equity, has or have been tried and determined in favour of the Defendant or Defendants in such suit or suits, or in which the Plaintiff or Plaintiffs at Law have been nonsuited, or

suffered judgment as in case of a nonsuit, or discontinued, or in which an injunction hath been refused, or having been granted, hath been dissolved, in any Court of Equity before the passing of this act; nor to any Letters Patent in respect of which any suit or suits at Law or in Equity has been commenced before the first day of June now last past."

We would respectfully ask the Honourable House—why are Plaintiffs who may have *untried* causes pending, to be debarred the benefit of the act?—We should be sorry to suspect that the private interest of a client had by any honourable member been made a specific subject of legislation; but looking at the last three lines of this new clause, and associating them with our own knowledge of facts, we say shame on it—let those lines be expunged.

Toward the end of clause VIII., after the words "caveats have been unecessarily multiplied, and other inconveniences have been occasioned," the following is adopted instead of the concluding paragraph: "Be it further enacted, that every Patent shall have a title containing such an outline or sketch of the invention as will convey a clear and distinct idea of its nature and objects."

It is a matter of considerable surprise to us, after the immense trouble which has been taken to instruct the Committee of the House of Commons on this subject, that an act should be passed by them, compelling every petitioner to give in his title such an *expose* ("such an outline or sketch of his invention as will convey a clear and distinct idea of its nature and objects") as will enable any opposing interest under a caveat to come forward and declare, in the words of the title containing the said outline or sketch, the very same subject of invention to be that which he claims under his caveat. The original intention of this clause, as suggested by us, may be seen under the head *Preparatory*

Specification, in our preceding volume, at page 186. It is impossible that this clause can pass, in its present shape, into a law; perhaps, with the addition, "such outline or sketch being sealed up and directed to the Attorney or Solicitor-General, to be opened by him previous to his report, in the event of an opposing caveat," might sufficiently qualify the clause to prevent mischief; but, deprived as it is of its corresponding clause referring to caveats, we think it had better be expunged altogether.

Clause IX. enacts, that the term of a Patent shall commence, and an invention be protected, from the day of presenting the petition; that must be subject to the contingency, whether the Patent is granted or refused by the Attorney-General, the latter of which would very frequently happen if the preceding clause is not altered. But a very extraordinary oversight occurs in this clause; it should have been added, as recommended under the head *Priority of Patent Right,* page 187, in our preceding volume, "provided that the petitioner causes all subsequent fees to be paid, and application to be made at the proper office for appending the great seal to his Patent within three months from the date of his petition; in default of which all fees paid, and privileges resulting therefrom, to be forfeited." Without this condition, it is quite obvious that on paying TWO POUNDS TWO SHILLINGS AND SIX-PENCE, at the Secretary of State's office on depositing his petition, his invention is protected from infringement, and there is no obligation for him to proceed further, for virtually he has then obtained a Patent right according to the letter of the law.

If our limits would allow, we should have a few words to say on the other clauses, but they are comparatively unimportant; we shall therefore only remark, in conclusion, that however desirable it may be to protect gratuitously from infringement, for a limited period, new devices and patterns

of articles manufactured in porcelain, metal, or any other composition, yet it does not appear to us that the subject is very properly associated with Patents for inventions which are obtained under a routine of heavy official fees, and granted by royal prerogative through the operation of the great seal.

Novel Invention.

ELASTIC FABRIC.

A PATENT has lately been obtained by Mr. Sievier for the manufacture of an elastic fabric, for wearing apparel. One important feature proposed, is to produce stockings, which shall be capable of affording any required degree of elastic pressure upon the leg, to be applied for surgical purposes, instead of continuing the old practice of bandages.

One modification of the invention applies to the forming of an elastic band round the upper part of an ordinary stocking, in order to supersede the necessity of garters. The Invention also extends to the manufacture of an elastic woollen cloth or kerseymere, which will be particularly applicable to the making of tight pantaloons and trowsers, backs of waistcoats, and a variety of other articles of dress, where tightness and elasticity may be desired. The Specification of this Invention will probably appear in our next.

Original Communications.

To the Editor of the London Journal of Arts, &c.

Sir,

I have had the pleasure of co-operating with you, and with other men of enlightened views and liberal feelings, in the promotion of measures which, we believed, would tend towards an improvement of the law affecting Letters Patent for inventions. Our endeavours were directed to bring before that portion of the legislative body to which the measure of revision was especially referred, the opinions, views, and expectations founded on experience and practical conversancy with the subject, of men of business, whose interests were more immediately implicated in the enactment of a salutary law for the encouragement of useful inventions, and for the protection of the acknowledged rights of inventors. It was presumed that information derived from such sources would be useful in framing the provisions of an act which was to render the grant of exclusive privileges to inventors, conformable to the knowledge and wants and usages of society in its actual condition. I know not with what sentiments others who have interested themselves in the procuration of a better law, may contemplate the now projected change; but if I may be permitted to speak of it as a matter subjected to the judgment of individuals, I must confess that I view with feelings of profound disappointment the form now

given to the measure, as it appears in the Bill passed by the House of Commons, and in progress through the House of Lords, for the proposed redress of the long and universally recognized evils of the existing law and practice of Letters Patent for inventions. For, whilst those classes of the community directly interested in the encouragement and in the exercise of inventive talent, and in the ample security of its compensatory privileges, have loudly and unanimously declared, that the present practices connected with the issue of Letters Patent for inventions are inimical to the free exercise of those faculties in individuals, from which it is allowed that all improvements in the useful arts emanate, and consequently from which the physical condition of man derives amelioration, inasmuch as the right to claim an exclusive property for a limited time in his own invention is burthened with pecuniary demands, which are absolutely prohibitive to by far the greater number of inventors, as the process of suing for the public recognition of the right, under the forms of Letters Patent, is so clogged with the official forms of an obsolete state of society, as to make it an especial business to pursue the suit; and, from its useless intricacy and unnecessary dependency on the will or physical ability of individual persons, the process of suing for the Patent is protracted into indefinite delay, so as commonly to endanger, and frequently to have given occasion for the loss of, the sole knowledge of the invention, which is made a condition of the pretension to an exclusive right; and, finally, as the grant, when made, is left open to many doubts, cavils, and arbitrary opinions on its validity, as to confer a right of very equivocal tenure—yet, it is now proposed to leave this unjust and impolitic system of practice to be the substratum of statute enactments, framed evidently on a very partial view of the subject, and seemingly designed only to better the condition of some

present Patentees, by expunging instantaneously grave objections which, under the existing order of things, may beset, and perhaps threaten with extinction, their exclusive privileges. In the proposed modification of Patent Law, not even a glance is cast, with a view to remove the actual disabilities of that numerous and most efficient class of inventors—the practical mechanics—men who derive their inventions from an intimate knowledge of the ends to be aimed at, and familiarity with the means of accomplishment, and who observe and feel hourly the defects and wants they seek to remedy; yet it is a glaring fact that the knowledge and experience of such men are now in a great measure neutralized, and their efforts in the path of improvement paralysed by their inability to satisfy the huge demands for the compensation of official labour, under the old and actual system.

The projected law contemplates, indeed, the legalization of the sale of inventions, to the end that the purchaser may become a Patentee of the bought invention. Will such a provision, I would ask, take the poor man from under the grinding tooth of the greedy capitalist? Will it not oblige him, as now, to offer secretly a half-known untried project, under all the obvious disadvantages of a chapman of such wares, to the shy, but avaricious buyer, instead of enabling him to enter the open market with a commodity, the quality of which is free for investigation, or perhaps already stamped by the proof of full experiment? It will be obvious at a glance whether the proposed extension of the grant of Patent privileges be a boon to the poor inventor, or to the race of wealthy speculators in the ingenuity of others. If useful invention lead to public good, it is not only equitable, but of the soundest public policy to place the inventor, without labour, difficulty, or cost to himself, beyond the barest contingent necessities, in a situ-

ation to reap the first fruits of his own profitable talent. Into the details of a measure, which professedly does not go to supplant a system of avowed insufficiency, and wholly inappropriate to the present wants and knowledge of the community, by a well digested enactment based on sound principles and enlightened views, it is needless to enter at present. The measure has still to undergo an investigation before a body of legislators, capable of enlarged views, and imbued with practical wisdom; and this investigation may prevent another shred from being added to the patchwork, which overloads and deforms our ancient scheme of legislation.

Men who, from their situation and circumstances, may be supposed to have private views and especial interests in the present movement on Patent Laws, urge seriously and incessantly on the advocates for an enlarged and enlightened legislation on this important subject, that it is impossible, in the actual state of public business, to get a complete and well digested law passed this session; that there are great prejudices to overcome in touching the subject legislatively; that there must be a precedent obtained; that vested interests must be held sacred, although based upon abuse, and inimical to public good; help us, say they, to get at once these two or three important improvements upon the present system, and we will hereafter co-operate with you strenuously in endeavours to obtain the other called for changes. If our legislative power be indeed so overwrought, or so wrapt in prejudice, or so amenable to individual influences, as not to be now in a condition to digest and weigh well, and conscienciously to make provision for, the whole of this great subject, I cannot but be of opinion that the reflective and orderly classes, on whose interests the matter more immediately presses, will patiently sustain their privation of rights yet some time longer,

until our legislation shall be in a fitter condition to listen to, and redress the grievances under which they have so long laboured, and to promote, by wise laws, the future advancement of the useful arts of life.

I am, Sir,

Your most obedient Servant,

CHARLES TOPLIS.

Museum of National Manufactures,
and of the Mechanical Arts,
Leicester Square.

On the New Patent Act relative to Inventions.

To the Editor of the London Journal of Arts and Sciences.

Sir,

The period appears approaching in which success will crown the exertions which have been made by you for a series of years, to procure legislative protection to the property of Inventors, and a rational system of law for the guidance of the judges and of the public in matters of Patented Inventions.

It is now of little consequence to examine the various schemes and suggestions which have been offered by public bodies and others for the improvement of the law, as we have happily attained the *first* fruits of strenuous exertion and procrastinated expectations by the actual passing of a Bill through the *Commons House of Parliament,* "To Amend the Laws respecting Letters Patent for "Inventions," &c.

The Act, as far as it goes, is highly valuable; and notwithstanding many defects, and the delay to another session, (I trust not longer) of the destruction of that series of antiquated useless proceedings and enormous expenses which oppress the talent and enterprize of the whole empire, in the grant of Patents for Inventions.

I with pleasure offer the humble tribute of my thanks to the Committee who have prepared the Bill,—for what they *have* done;—the public must fight the rest of the battle—blow up the old Hanaper and State fees, and enormous stamp duties which still wither our best exertions, *and entrench the present Act behind stone ramparts;* when *this* mine is sprung, we may *then* shout VICTORY!

My present object, Sir, is one of mere practical business; it is, through the medium of your Journal, respectfully to solicit the attention of the House of Lords, in Committee upon this Bill, to some absolutely necessary *additions* to it, in order to make it as free as possible from anomalies, and as operative as its scope will allow, with scarcely any *alteration* of actual clauses as determined upon by the Commons. I trust my observations may be in time to be practically useful in the completion of the Act.

Referring to the Draft of the Bill, as printed in your last number, commencing at page 352, clause I., line 11, there should be added a provision—"*That executors, administrators, and others coming into legal possession of an invention otherwise than by communication or sale from the inventor, may also take out a Patent under the provisions of this Act.*" If this be not added, the intended, but not completed, Patents of persons dying—of insolvents, &c., cannot be secured to their representatives, assignees, &c.

The next addition which I propose, is to cure an anomaly in clause V., line 12;—the words "or such origi-

nal or *amended* specification" occur; whereas no previous mention of an *amended* specification is made. It is evident that some regulation respecting an *amended* specification has been omitted. I propose to remedy the defect by the addition of a clause to follow clause IV., viz.—" *And be it enacted, that every inventor, or his legal representative, may make one amended specification previous to any notice served of action, or suit, commenced or depending, relative to a patented invention, which amended specification may and shall supply and rectify the omissions and errors* (vide clause IV.) *of the original specification, as far as may be, and may embody improvements subsequently made in such invention; and such amended specification shall be inrolled in addition to, and as explanatory of, the original specification.*"

To allow an inventor or his legal representative to embody improvements in an amended specification, is an advantage to the public; as otherwise those improvements might be made the subject of a Patent running beyond the term of the original grant, to which I propose the liberty of appending them. Clause V. will now read without any discrepancy as to *amended* specifications. The portion of the clause allowing the Lord Chancellor or Keeper of the Seal " to direct such alteration in the title of the Patent, or in the said Specification, or in either of them, as shall truly describe the invention, should be continued by the addition of the words '*or he may direct a further specification to be made and inrolled.*' "

Without the above addition, there will remain an ambiguity as to the specific extent of the power of the Chancellor or Keeper, and a discrepancy with clause VI., which speaks of " such *further* and amended specifications."

Clause VI. should conclude with these words :—" *each in the same office wherein its respective original specification*

was inrolled." The propriety of inrolling the further and amended specifications in the same office with their respective originals is obvious.

In clause VII., last line, read "to amend the title or *any* specification in all matters of form," and continue, "*and of mere literal or verbal omissions and errors.*" These words make the clause to correspond with clause IV.

Clause XIV. appears to me (I may be in error), to require the attention of the judges, or of peers who have been professionally educated. "The jurors who are to try the issue" (upon order of the court obtained) "may examine the specification and accompanying drawings at least two days *before* the day of trial." Now as a trial actually commences by the impanelling of the jury, how are the jurors to act two days before their existence? This curious legal abortion requires a little of the Lord Chancellor's nursing.

I submit that the examination should extend, if deemed necessary, also "to the actual works, manufactures, or processes connected with the subject in issue."

Clause XV., enacting "that *all* the provisions therein contained shall apply to all Letters Patent then unexpired," &c. is loosely framed; the words "*so far as they may be severally applicable,*" after the words "shall apply," would render the clause distinct.

Upon clause XVI. I will only remark,—that the securing of patterns to their inventors for twelve months respectively, WITHOUT EXPENSE, is excellent in its *broad principle.* Let the advocates of high priced Patents for Inventions inform us why this benificent and politically sound principle should not be extended to the million who would have life, and energy, and intellectual vigour infused throughout their mass; and countless moral benefits conferred by the *immediate* removal of the galling oppressive load of Chancery-

and-State, useless formalities, fees, and stamp-duties which blast, and almost annihilate the inventive genius and talent of this vast empire.

Is the principle of protection WITHOUT EXPENCE good and sound for patterns—bad and utterly inexpedient for all other and more important inventions?

I am, Sir, Your's, &c.

VINDICATOR.

COCHRANE AND GALLOWAY
v.
BRAITHWAITE AND ERICSSON.

Court of King's Bench,

Before Chief Justice Sir Thomas Denman.

THE subject of this action has been for the last three years under legal investigation, and being now brought to a final issue by the verdict of a jury, we consider that a particular account of the trial will be found interesting, as the question appears to be one which involves some very subtle points of argument as to novelty of elementary principle—of combination—and of effect.

The Specification of Messrs. Cochrane and Galloway's invention, said to have been infringed by the Defendants, will be found in the fifth Volume of the London Journal of Arts, Second Series, page 340; that of Messrs. Braithwaite and Ericsson, in the fourth Volume of the same Series, page 188.

It appears to us, that the leading feature of the Plaintiff's invention is the retention of a volume of atmospheric air in a condensed state, within a close furnace, in order to

effect a perfect combustion, not only of the fuel, but also of the inflammable vapours and smoke emitted from the fire. This is proposed to be effected by enclosing the furnace in a close chamber and supplying the air for the support of combustion by injection from a blowing apparatus; the extremity of the flues or chimney being partially closed by a loaded valve, or by any other means, so as to prevent the rapid escape of the smoke, and other vapour. By this arrangement, a very copious volume of oxygen is supplied and retained in the furnace and flues, and the incombustible part of the vapour only (free from smoke), is discharged into the chimney, which is done by the force of the blowing machine, partially raising the valve at the opposite extremity of the flue or exit aperture; or a similar effect may be produced, if instead of employing the loaded valve, the escape of the smoke is impeded by contracting the exit part of the flue.

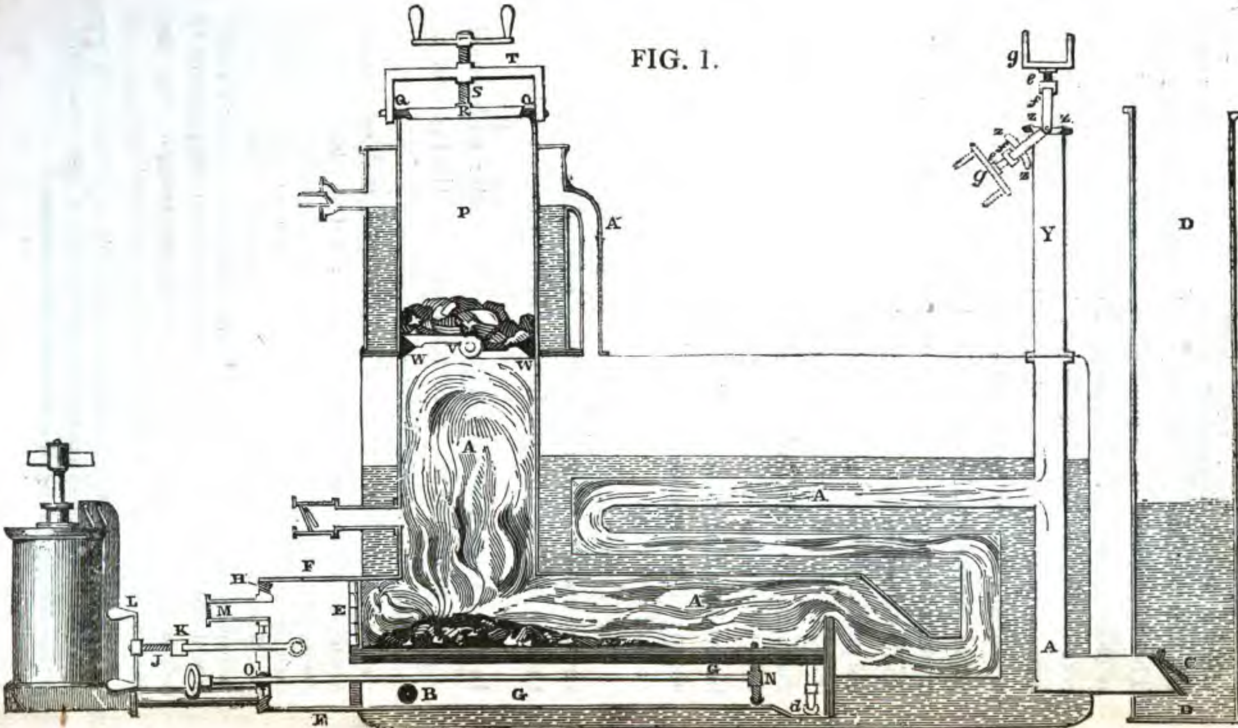
The Defendants place their furnace in a chamber, the air to support combustion, being injected by a pump, and the flue leading from the furnace being a narrow tube.

In order that these inventions may be better understood, we subjoin sectional representations of the two boilers, with their appendages:—

Fig. 1, shows a view of Lord Cochrane and Galloway's air-tight furnace, with the fuel magazine and a blowing pump attached to a boiler for a *condensing* steam-engine; shewing one end of the exit furnace pipe at A, discharging the rarified air, gas, &c., at the valve C, into a column of water in D. When they are so discharged, then the valve plate Z, Z, must be closed at the upper end at Y, of the exit-pipe; but when they are required to be emitted at Y, then the cover Z, Z, is opened, and falls down with its swinging-frame by the side of pipe Y. This is one of the drawings that accompany their specification, and in accordance with the model introduced into Court.

Fig. 2, shows a view of Braithwaite and Ericsson's *close* furnace, with fuel-hopper and blowing-pump attached to a boiler for a *high-pressure* steam-engine, as taken from the drawings that accompany their specification.

FIG. 1.



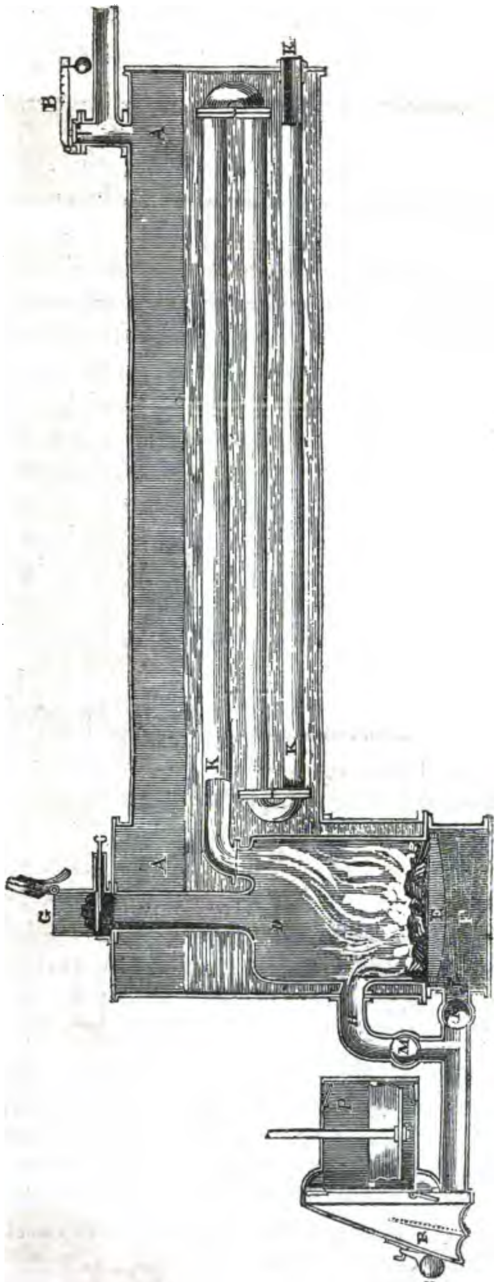


Fig. 2.

The Plaintiff's case was conducted by Messrs. Pollock, Hill, and Kelly, that of the Defendants by Sir James Scarlett, Messrs. Follett and Rotch.

Mr. Pollock in his opening speech, stated that the object of the Plaintiff's Patent was to effect a saving of fuel, and remove the annoyance of smoke by producing an improved combustion of the fuel within the furnace.

The Plaintiff in his Specification describes his apparatus to consist of an air-tight or closed furnace, into which air is forced by a blowing cylinder or other mechanical instrument; that the air thus introduced is retained within the furnace and flue, by placing at the exit of such flue a loaded valve (or any other means of producing suitable compression) until the heated air is exhausted of its useful properties; that the furnace has a magazine attached for supplying it with fuel, constructed with two doors or valves, so that when the fuel is introduced, the outer valve is open, and the inner one closed, by which arrangement the heated air contained within the furnace is prevented from escaping into the atmosphere.

The Plaintiff does not claim any particular part of this apparatus, but it is the combination and application of the whole which constitutes his Patent right. He understood that the defence which his learned friend Sir James intended to offer was, that the object of the Defendant's Patent is essentially different from that of the Plaintiff's, for the former aims at forcing the greatest possible quantity of air with the utmost rapidity through the furnace and flue, while the latter retains the air within the furnace and flue. There can be no doubt (said Mr. Pollock) that the greater the supply of air, the more perfect would be the combustion of the fuel; but as to its being forced through the flue with the utmost rapidity when the object is to heat such flue, that doctrine he denied, and when he looked at the Defendant's drawing, and there found the flue gradually diminishing from the furnace to the exit, could it be said that the Defendant's object was to force the air through the flue with the utmost rapidity? Why, if such was the Defendant's intention, instead of making his flue smaller at the exit, he would rather increase it.

Mr. Pollock likewise understood that his learned friend Sir James intended to show that the Plaintiff in his Specification claimed a loaded valve at the exit, as being essential for producing compression of the air within the furnace and flue, and that the Defendant had no valve to his machine. It is true that the Plaintiff describes in his Specification the necessity of placing at the exit of the flue a loaded valve or any other known means of producing required resistance, but would it be pretended for one moment that the Defendant's plan of narrowing the exit pipe was not one obvious means of producing required resistance, and the loaded valve another, and that the Plaintiff had as much right to it as the Defendant, since, in his Specification, he claims every known means. It was quite clear to every discerning mind that the Defendant's Patent, taken out eleven years after the Plaintiff's, was not only to effect the same object, but that the mechanical arrangement in both was similar; and he, Mr. Pollock, should call several of the most eminent men in this country who would prove that the Defendant's Patent was a close imitation of the Plaintiff's.

Mr. Turrell was then sworn.—Said he was a mechanical draftsman, and had had considerable experience in Patents for machinery; that he had carefully compared and read at the Inrolment Office the Specification and Drawings of the Plaintiff's and Defendant's Invention; the certified office copies of both which he now produced were correct; that upon comparing the two Specifications, he found both aimed at producing an economical mode of generating heat, and the means employed by both were similar, and he would thus describe them by quoting the expressions contained in each Specification:—

The Plaintiff claims an air-tight furnace as part of his apparatus for generating steam.	The Defendant uses an air-tight furnace as part of his apparatus for generating steam.
The Plaintiff supports the combustion of fuel in his furnace by forcing in atmospheric air by means of a blowing or air-forcing pump.	The Defendant supports the combustion of fuel in his furnace by atmospheric air forced into the furnace by means of a blowing or air-forcing pump.
The Plaintiff introduces air from the blowing pump through a pipe under the fuel, but describes it to be	The Defendant introduces air from the blowing or air-forcing pump through two pipes, one of which sup-

his intention to let it enter at any convenient part or parts of the furnace, that is to say, either under or above the ignited fuel.	plies air under the fire, and the other above.
The Plaintiff supplies fuel to the fire from a vertical air-tight magazine, which might, with equal propriety, be called a hopper.	The Defendant supplies fuel to the fire from a vertical air-tight hopper, which might, with equal propriety, be called a magazine.
The Plaintiff supports the supply of fuel upon the surface of a moveable plate or valve, which plate or valve is capable of being moved, and thereby delivering a supply to the fire by a rod or handle on the outside of the magazine or hopper.	The Defendant supports the supply of fuel upon the surface of a moveable plate or valve, which plate or valve is capable of being moved, and thereby delivering a supply to the fire, by a rod or handle on the outside of the hopper or magazine.

This he conceived to be the analysis of the two Patents. Had several times seen a boiler at work at Mr. Galloway's, constructed in conformity with his Specification, and which was generating steam for the engine driving the machinery in the manufactory—witnessed its operation as lately as yesterday. From the frequent and attentive observations which he had made, he felt convinced that the Defendant's Patent was a complete infringement of the Plaintiff's.

Mr. Pollock then called Mr. Brunel, Civil Engineer, and Fellow of the Royal Society. Had been constantly engaged as an engineer for the last 34 years, during which time he has had considerable experience in various kinds of machinery, as well as Patent Inventions. Had carefully and attentively examined the Specifications and Drawings of the Plaintiff's and Defendant's Patents, and he found the essential principle of both the same, and had never in his experience met with a more palpable infringement. Considered the Plaintiff's Specification quite clear, and such as would enable any competent workman to construct a machine from it. Had witnessed the performance of a boiler made in conformity with Mr. Galloway's Specification, at work, and attached to the engine employed in Mr. G.'s manufactory for driving the machinery, and so complete was the combustion of the fuel, that no smoke escaped from the exit pipe.

Mr. Brunel cross-examined by Sir James Scarlett.

Point out what part of the Plaintiff's apparatus is new.—I do not think any part taken separately is new; it is the combination

and application of the whole which constitutes the Patent, and this he believed to be quite new.

Dr. Birkbeck was then sworn.—Had examined the Plaintiff's and Defendant's Patents carefully, from which he collected that the object of both was to produce an improved combustion of fuel, which was effected by forcing a copious supply of air into an air-tight furnace, and retaining the heated air within the furnace and flue as long as should be deemed sufficient for exhausting it of its useful properties. That the Plaintiff had provided the means of feeding the furnace, by using a magazine with two doors or valves, so that when the outer one is open for the introduction of the fuel, the inner one remains closed, and thus the heated air contained in the furnace, is prevented from escaping. The same means he finds employed by the Defendants for effecting the same object, except that he produces compression of the air within the furnace, by using a small pipe at the exit of the flue, whereas, the plaintiff shows in his drawing, a loaded valve for producing the compression; still as Mr. Galloway claims in his specification, any other known means of producing required resistance, the small pipe is as much his as the Defendant's. He should say, the loaded valve in many cases was a better plan, as by its use, the compression of air could be varied and regulated to suit the pressure of air forced into the furnace, whilst a small pipe was fixed, and must always remain the same. Witness had seen Mr. Galloway's boiler, made in conformity with his Specification; it was attached to a steam engine employed in driving the machinery in his (Mr. G.'s) manufactory; the boiler performed its duty well, and no smoke issued from the chimney pipe.

Cross-examined by Sir James Scarlett.

Pray Dr. Birkbeck, what do you think of that part of the Defendant's Specification, which provides that an air exhausting apparatus, may be applied at the termination of the flue, for the purpose of quickening the draft, instead of employing a blower at the furnace end?—*Ans.* The notion of exhausting the current of air, seems only fit to be entertained by mechanical babes. I feel quite sure it can be of no practical utility.—The learned Judge

asked Dr. Birkbeck, whether there was anything omitted in the Plaintiff's Specification, which appeared in the Defendant's?—*Ans.* No; and in my opinion the Plaintiff's Specification is much more clear and descriptive.

Mr. C. F. Partington was then examined.—Is a professor of Mechanical Philosophy, and author of several scientific works, one of which treats on the Steam Engine—has carefully examined the Drawings and Specifications of the Plaintiff and Defendant, and considers that the Defendant has committed an indisputable infringement on the Plaintiff's Patent. Had called several times accidentally at Mr. Galloway's manufactory, when he has witnessed the working of a steam-boiler, made with an air-tight furnace, and otherwise in conformity with the Plaintiff's Specification; it was generating steam for the engine then driving the machinery in the manufactory. The boiler acted perfectly, and the combustion of the fuel was so complete, that no smoke escaped from the chimney pipe. Has seen some of the Defendant's machines at work, which were constructed on the same principle as the Plaintiff's, and in both cases the effect produced was the same. One of these machines, erected by the Defendant at Messrs. Cubitt and Co.'s, the builders, had a blowing apparatus attached to it, for forcing the air; and all the machines which he had seen of the Defendant's manufacture had a similar apparatus. In his mind there was no doubt that the Defendant's and Plaintiff's machines were alike in principle.

Mr. Francis Bramah was next called.—Said he is an engineer carrying on an extensive business at Pimlico, and son of the celebrated Joshua Bramah. Had made a careful examination of the Plaintiff's and Defendant's Specifications and Drawings, and gave it as his decided opinion that they both acted on the same principle. The Plaintiff's Specification was quite clear and descriptive, and such as would enable any competent workman to make a machine from it. Had witnessed the performance of a boiler erected by Mr. Galloway at his manufactory, which was made in conformity with his Specification, and it worked ex-

tremely well. Had seen a boiler at work at Defendant's manufactory, which was constructed on the same principle as the Plaintiff's; he gave it as his opinion that the Defendant had infringed the Plaintiff's Patent.

Cross-examined.—Did you see the interior of the boiler at Mr. Braithwaite's?—No; I could not see the flues because it was at work.—Then how do you know that it was similar to the Plaintiff's?—By the essential parts which were visible to me, and the result I saw produced.

This closed the Plaintiff's case.

Sir James Scarlett addressed the Jury for the Defendant at some length, but the principal points which he dwelt upon were, 1st. The great difference of principle between the two inventions: for, said he, the object in that of the Plaintiff is confessedly to detain the heated air within the flue, whilst that of the Defendant is to accelerate it as much as possible. 2d. The Plaintiff claims and uses a loaded valve at the exit, and the Defendants have no valve whatever. He should prove by several witnesses that the two Patents were different in their modes of action.

Charles Cheffius, was then sworn.—Said he was a draftsman; he had seen a boiler at Mr. Galloway's manufactory, which was said to be constructed according to his Specification, but there was no column of water at the extremity of the flue, nor any obstruction whatever, for he saw the smoke issuing out of the top of the pipe which should have held the water; was perfectly acquainted with the boilers made by the Defendant; they were quite different from the Plaintiff's.

Cross-examined.—Is 25 years of age; at the time he went to Mr. Galloway's to see his boiler, he was in Messrs. Braithwaite's employ as a draftsman; he was sent by them; when he applied for admittance at Mr. Galloway's, he did not say whom he came from, and no objection was made to his entrance; he entered his name in a book, and was then allowed to see the boiler.

Francis Cooke was then sworn.—Said he was a working engineer, and 22 years of age; had worked for Mr. Galloway, and was employed to look after his patent boiler; that all

the time he attended it, in his opinion there was more smoke came out of the exit pipe than from an ordinary chimney. That there were two patent boilers erected at Mr. Galloway's, the one a low pressure for working the steam engine employed to drive the machinery in the manufactory, and the other a high pressure used for experiments. The Defendant's boilers were quite different and worked very well.

Cross-examined by Mr. Pollock.—You say that you worked for Mr. Galloway?—Yes. What did you quit his service for?—He sent me away. Why?—Because I made an affidavit for Mr. Braithwaite while in Mr. Galloway's employ, and when this case was in Chancery. Who asked you to do so?—A fellow workman who had formerly been in Mr. Galloway's employ, but had left and was employed by Mr. Braithwaite. Did not Mr. Braithwaite give you a sovereign for making the affidavit?—No. How much then?—The price of a dinner. I suppose ever since you quitted Mr. Galloway's service you have been employed by Mr. Braithwaite?—Yes.

Mary Ann Bird was next sworn.—Said she is now a widow, and accompanied her husband in the *Rising Star* steamer to South America, which was fitted with one of Mr. Galloway's smoke consuming apparatus. Her husband was one of the working engineers on board. When the vessel arrived out, the machinery did not answer properly.

Cross-examined.—Did not know why it did not answer. Could not say whether it was owing to the engines not being powerful enough to propel the vessel and work the blowing cylinder. Did not know that the engines were made by Mr. Maudslay, and not by Mr. Galloway.

Dr. Ure was then sworn and examined.—Said he had attentively considered the Plaintiff's and Defendant's Patent, and believed them to be quite opposite in their principal mode of action. That Mr. Galloway's plan detained the air forced into the furnace, whilst Mr. Braithwaite's allowed it to pass through as quick as possible. He could only designate the former as aiming at forcing an intermitting current of air through the furnace and flue for the purposes of combustion, whilst the object of the

Defendant was to force through a continuous stream or non-intermitting current of air, and thus the two machines were different in principle. That by the length and narrowness of the Defendant's flue, as well as by its tapering and winding forms, the heat was more completely extracted from the column of air. That if a short flue of large area was used, the centre of the column of air, which is always the hottest portion, might pass off into the atmosphere without imparting any of its caloric to the pipes; but that by diminishing the size of the column, and compelling a constant change of its particles by means of the continued narrowing of the flue and its different bends, there was little chance of any portion of the column escaping without coming in contact with the sides of the flue, and that the column of air at the exit of the Defendant's flue, as he had witnessed, comes out nearly cold.

Cross-examined.—Is not the mode of forcing air into the furnace, shown in the Defendant's Drawing, similar to that of the Plaintiff's? — Yes, it is. So that if the blowing cylinder shown by the Plaintiff's in their Drawing is kept constantly at work, the stream of air forced in will be continuous?—Yes, certainly.

Dr. Arnott was then called.—He had examined the Drawings and Specifications of the Plaintiffs and Defendants, and considered the two modes of generating heat quite different, for similar reasons given by Dr. Ure.

Cross-examined by Mr. Pollock.—Taking hold of the two models, one of the Plaintiff's, and the other the Defendant's machines, and calling Dr. Arnott's attention to follow him in comparing each part of the two machines. Dr. Arnott, when asked what difference existed between the two machines, said there was very little, and when further questioned as to what that little was, replied—only in *form*.

Mr. Sadler was then sworn.—Had examined the two Specifications, and could see nothing new in any part of the Plaintiff's Invention, nor utility in it as a whole; the throttle valve in

particular for supplying the fuel he had known to be used upwards of 40 years ago, but abandoned owing to its liability to get clogged. He could say from long practical experience that an apparatus constructed in the manner described by the Plaintiff could not be employed to any good effect.

Cross-examined.—When you say you know of a double throttle valve being used 40 years ago, do you mean that it was attached to an air tight furnace like the Plaintiff's?—No, it was attached to a balling furnace used in an iron manufactory, and which had a common fire door and ash pit. Did you ever see, previous to the plaintiff's patent, a combined apparatus similar to his?—No, he could not say he had.

Mr. Joshua Field, of the firm of Maudslay and Co. was next called.—Said he was an engineer; had carefully examined the Plaintiff's and defendant's Specifications, and thought the mode of generating heat adopted by the Defendant altogether different from that of the Plaintiff.

Cross-examined.—Had seen Mr. Braithwaite's boiler in operation, but had never seen Mr. Galloway's.

Mr. W. Braithwaite sworn and examined.—Had the management of the Defendant's manufactory; who had made and sold several of his patent boilers. The greater proportion of them was with an exhausting apparatus instead of a blower, indeed they never now made any with blowers, as they were not found to answer so well. The Defendant's boiler was altogether different from the Plaintiff's.

Cross-examined.—Is brother to the Defendant; had been a farmer, but is now an engineer. The boiler erected by Defendant at Messrs. Cubitt's, has a blowing apparatus attached to it, so had the engines they made for Captain Ross, and likewise the *Novelty* steam carriage, and the steam fire engine.

Mr. Cubitt was then sworn.—Said he was a builder, and carried on business in Gray's-Inn-Lane. The Defendant had supplied him with one of his machines, which worked to his satisfaction.

Cross-examined.—Has the machine in question a blowing or an exhausting apparatus?—A blowing apparatus.

Mr. Sorenson sworn.—Is a draftsman in Mr. Braithwaite's office; has examined the Plaintiff's and Defendant's Drawings and Specifications, which in his opinion are quite different. Is fully acquainted with the machines made by the Defendant, and can say they are not like the Plaintiff's Drawing.

Cross-examined.—Is a Norwegian, 25 years of age, and has been employed by Mr. Braithwaite eighteen months.

Mr. Pollock then replied, and called the attention of the jury to the character of the evidence which had been brought forward by the Defendant; he dwelt particularly on the testimony of Francis Cook, the youth who had been bribed by the Defendant while in the employ of the Plaintiff, as well as that of Mary Ann Bird, and C. Cheffius, the draftsman, who had been sent as spy to the Plaintiff's manufactory;" and said Mr. Pollock, " what was singular enough, two of these witnesses swore to matters of fact, the reverse of that which had been deposed to by the five respectable and experienced men called by the Plaintiff. But he (Mr. Pollock) was quite sure that the gentlemen of the jury would view such testimony in the proper light. It was absurd to suppose that such men as Brunel, Bramah, and Birkbeck, Turrell and Partington, would sacrifice their professional characters by giving their testimony in such unqualified terms, unless it were founded in reason and truth. He felt assured that their evidence was so clear and decisive that the gentlemen of the jury would give him that which the law and justice of his case merited—viz. a verdict."

The Lord Chief Justice then proceeded to sum up the case, and after carefully detailing the evidence on both sides, his Lordship observed, that his predecessor, Lord Tenterden, had in the former instance nonsuited the Plaintiffs, from an idea at that time that the valve at the extremity of the flue was the essential feature of the Plaintiff's Invention, and that as the Defendant did not use a valve, it could not be said that the two machines were similar, but for his part he did not consider such valve an indispensable condition of the Plaintiff's Invention.

The Plaintiff in his Specification, says c, is the plate or valve, by which the smoke, gas and heated air are compressed, according to the pressure placed on such plate or valve, either by any weight or fluid or by any other known means of producing required resistance. All that seemed indispensable was, that the required resistance, the necessary degree of compression, should be produced, and if that could be obtained by narrowing the outlet as well as by a weighted valve, he thought such a mode of effecting the object, must be held as being covered by the words "any other known means of producing required resistance." Several of the Defendant's witnesses had given it as their opinion that an apparatus constructed in the manner set forth in the Plaintiff's Specification would not work, but he did not think any mere opinion of this sort, was to be put in competition with the positive testimony of such men as Brunel, Bramah, Birkbeck, Turrell and Partington, who all swore that they had actually seen the Plaintiff's apparatus at work. He left the case to the gentlemen of the Jury, who were to consider carefully the evidence which they had heard, and give their verdict accordingly.

The Jury then retired, and after an absence of three quarters of an hour, returned, and found a Verdict for the Plaintiff, with damages.

New Patents

SEALED IN ENGLAND.

1833.

To Charles Terry, of Shoe-lane, in the city of London, merchant, and William Parker, of New Gravel-lane, Shadwell, in the county of Middlesex, merchant, for their invention of improvements in making and in refining sugar.—Sealed 26th June—6 months for inrolment.

To Charles Terry, of Shoe-lane, in the city of London, merchant, and William Parker, of New Gravel-lane, Shadwell, in the county of Middlesex, merchant, for their invention of improvements in refining and purifying oils.—Sealed 26th June—6 months for inrolment.

To John Christophers, of New Broad-street, in the city of London, merchant, for his invention of an improvement or improvements on anchors.—Sealed 27th June—6 months for inrolment.

To George Beale Brown, of New Broad-street, in the city of London, merchant, for certain improvements in machinery for making or manufacturing pins of the kind which are commonly used for fastening wearing apparel, being a communication from a foreigner residing abroad. —Sealed 27th June—6 months for inrolment.

To Christopher Piggott Banks, of Bewdley, in the county of Worcester, brass founder, for his invention of an improvement in the manufacture of certain culinary and chemical utensils and vessels.—Sealed 29th June—2 months for inrolment.

To Alexander Mitchell, of Brickfield, in the parish of Ballymacarrett, county of Down, in the kingdom of

Ireland, civil engineer, for his invention of a dock of improved construction to facilitate the repairing, building, or retaining of ships and other floating vessels.—Sealed 4th July—6 months for inrolment.

To William Crofts, late of Lenton, but now of Radford, both in the county of Nottingham, mechanic, for his invention of certain improvements in machinery for making bobbin net —Sealed 4th July—6 months for inrolment.

To William Newton, of the Office for Patents, Chancery-lane, in the county of Middlesex, civil engineer, for certain improvements in machinery called roving frames, for roving cotton and other fibrous substances, being a communieation from a foreigner residing abroad.—Sealed 11th July—6 months for inrolment.

To Augustus Applegath, of Crayford, in the county of Kent, calico printer, for his invention of certain improvements in letter-press and block-printing, and in the machinery or apparatus used for the same.—Sealed 18th July—6 months for inrolment.

To John Squire, of Paddington Basin, engineer, and Francis Macerone, of Upper George-street, Bryanston-square, both in the county of Middlesex, for their invention of certain improvements on boilers for generating steam.—Sealed 18th July—6 months for inrolment.

To John Livesey, of Bolton-le-Moor, in the county of Lancaster, paper manufacturer, for his invention of certain improvements in the preparation of hemp, flax, and other fibrous material for the manufacture of glazing friction and mangel bowls, paper makers' felts, and other purposes.—Sealed 18th July—6 months for inrolment.

CELESTIAL PHENOMENA, for August, 1833.

D.	H.	M.	
1	0	0	Clock before the Sun 5 m. 59 s.
—			Sun rises 4 h. 25 m. sets 7 h. 46.
—			Moon rises 8 h. 37 m. p. m. sets 4 h. 50 m. A. M.
—			Moon passes the meridian 13h. 6 m.
	9	0	☽ in Apogee.
3	12	28	Jupiter's third sat. will imm.
5	0	0	Clock before the ☉ 5 m. 41 s.
—			☉ rises 4h. 31m. sets 7 h. 40 m.
—			☽ rises 9 h. 56 m. P. M. sets 9 h. 31 m. A. M.
—			☽ passes mer. 15 h. 56 m.
—			Mer. R. A. 10 h. 29 m. dec. 6. 3. N.
—			Ven. R. A. 5 h. 49 m. dec. 20. 27. N.
—			Mars R. A. 10 h. 52 m. dec. 8. 17. N.
—			Jup. R. A. 2 h. 13 m. dec. 11. 56. N.
—			Sat. R. A. 11 h. 46 m. dec. 3. 47. N.
—			Georg. R. A. 21 h. 41 m. dec. 14. 42. S.
—			Vesta R. A. 18 h 37. m. dec. 25. 20. S.
—			Juno R. A. 14 h. 50 m. dec. 3. 7. S.
—			Pallas R. A. 5 h. 57 m. dec. 3. 24. S.
—			Ceres R. A. 7 h. 22 m. dec 24. 43. N.
7	9	18	☽ in conj. with ♄ long. 5. in Aries ☽ lat. 4. 54. S. Sat. lat. 2. 8. N. diff. of lat. 2. 56.
7	55	50	☽ in □ or last quarter.
8	0	0	☿ stationary
10	14	22	Jupiter's first sat. will emerge.
10	0	0	Clock before the ☉ 5 m. 4 s.
—			☉ rises 4 h. 38 m. sets 7h. 31 m.
			☽ rises 11 h. 54 m. A. M. sets 3 h. 2 m. P. M.
—			☽ passes the meridian 19h. 54m.
11	19	22	☽ in conj. with ♀ long. 1 in Cancer. ☽ lat. 1. 3. S. ♀ lat. 2. 35 s. S. diff. of lat. 1. 32 s.
13	3	0	☉ and ♅ in opposition.
0	10	17	Ecliptic conj. or ● new moon.
14	10	26	Jupiter's second sat. will im.
15	22	6	☽ in conj. with ☿ long. 4. in Leo. ☽ lat. 4. 3. N. ☿ lat. 4. 39. dif of lat. 8. 42.
15	22	6	Clock before the sun 4 m. 14s.
—			☉ rises 4 h. 36 m. sets 7 h. 21 m.
—			☽ rises 4 h. 6 m. A. M. sets 7 h. 43 s. P. M.
—			☽ passes the meridian, noon.
16	19	50	☽ in conj. with ♂ long 14. in Leo. ☽ lat. 4. 36. N. ♂ lat 2. N. diff. of lat. 3. 44.
	12	17	Jupiter's 3rd. sat. will immerge.
	14	38	Jupiter's 3rd. sat. will immerge.
17	7	12	☽ in conj. with ♄ long 25. in Leo. ☽ lat. 4. 51. N. ♄ lat. 2. 7 N. diff of lat 2. 44.
19	10	44	Jupiter's first sat. will immerge.
20	0	0	Clock before the Sun 3 m. 10 s.
—			☉ rises 4h. 54 m. sets 7h. 11 m.
—			☽ rises 11 h. 7 m. A. M., sets 9 h. 45 m. P. M.
—			☽ passes the meridian 4 h. 29 m.
	7	45	☽ in □ or first quarter.
21	10	38	Jupiter's 2nd. sat. will immerge.
22	10	0	inferior conj. ☉ and ☿
	22	37	☉ enter Virgo.
25	0	0	Jupiter Stationary.
—			Clock before the ☉ 1 m. 54 s.
—			Sun rises 5 h. 2 m. sets 7 h. 0 m.
—			☽ rises 4 h. 47 m. P. M. sets midnight.
—			Mer. R. A. 9 h. 53 m. dec. 8. 53. N.
—			Venus R. A. 7 h. 20 m. dec. 20. 30. N.
—			Mars R. A. 11 h. 38 m. dec. 3. 11. N.
..			Jupiter R. A. 2 h. 15 m. dec. 12. 4. N.
—			Saturn R. A. 11 h. 54 m. dec. 2. 54. N.
—			Georg. R. A. 21 h. 30 m. dec. 15. 30. S.
—			Vesta R. A. 18 h. 36 m. dec. 26. 15. S.
—			Juno R. A. 15 h. 2 m. dec. 4. 57. S.
—			Pallas R. A. 6 h. 36 m. dec. 5. 43. S.
—			Ceres R. A. 7 h. 59 m. dec. 24. 1. N.
26	12	38	Jupiter's first sat. will im.
28	11	26	Ecliptic oppos. or ○ full moon.
	13	56	Jupiter's second sat. will im.
29	14	0	☽ in Apogee.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR JUNE AND JULY 1833.

1833.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.	1833.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
June.						July.					
26	65	43	30,83	29,70	,025	11	72	39	29,86	29,83	
27	66	43	29,74	29,62		12	65	48	29,81	29,79	
28	71	41	29,86	29,83		13	63	47	29,90	29,85	
29	72	39	29,86	Staty.		14	71	45	29,90	Staty.	
30	71	39	29,84	29,75	,025	15	75	46	29,99	29,91	
July.											
1	67	39	29,83	29,70	,05	16	74	49	30,14	30,08	
2	70	41	29,92	29,85	,025	17	78	49	30,15	Staty.	
3	71	44	30,02	29,97		18	79	51	30,09	30,01	
4	73	42	30,18	30,07		19	74	50	29,90	29,77	
5	75	43	30,13	29,97		20	69	44	29,72	29,66	
6	74	40	29,86	29,78		21	64	40	29,74	29,71	,05
7	71	42	29,77	29 71		22	63	40	29,71	29,69	,225
8	66	39	29,90	29,74	,1	23	68	43	29,72	29.66	,25
9	70	43	30,04	30,01	,275	24	64	39	29,99	29,84	,4
10	71	40	29,96	29,90		25	71	44	30,22	30,16	,025

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES,

AND

REPERTORY

OF

PATENT INVENTIONS.

No. XVII.

CONJOINED SERIES.

Recent Patents.

To Joshua Wordsworth, *of Leeds, in the county of York, machine maker, for certain improvements in machinery for preparing, drawing, roving, and spinning flax, hemp, wool, and other fibrous materials.*—[Sealed 26th July, 1832.]

These improvements in machinery for preparing, drawing, and roving flax, hemp, wool, and other fibrous substances, consist in a novel contrivance or mechanism to be adapted to the machine commonly called the gill, employed for preparing, drawing, and roving flax and hemp, and for combing and spinning long wool; which improvements

allow the points of the travelling heckles to continue longer in operation than in the ordinary construction of gill, and cause the heckle points to be withdrawn from the fibres at the end of the stroke without the possibility of their drawing the fibres down with them.

The manner of effecting this object will be seen by reference to the several figures in Plate III., which exhibit a gill on this improved plan in different views. Fig. 1, is a plan or horizontal view, exhibiting the upper surface of the machine; and fig. 2, is a longitudinal section taken through the middle of the machine: fig. 3, is a representation of the front of the machine, but in which several parts have been removed to show the action of the heckles more perfectly.

The several heckles *a, a, a,* are formed by a series of needles or heckle points set into a metal bar, as represented on an enlarged scale in figs. 4 and 5. These bars are each of them suspended in a frame or carriage *b, b, b,* (shown in two views at figs. 6 and 7) by means of double jointed levers *c, c,* seen in two positions, at figs. 8 and 9; the heckle bar, its levers, and carriage or frame, being shown put together in figs. 10 and 11.

When the heckles are in operation, the points are raised, as in fig. 10; but when they are withdrawn from the fibres, then the points are sunk down into the carrying frames, as fig. 11.

These two positions of the heckles are produced by the knobs or parts *d,* that project from the jointed levers *c,* acting against the edges of guide bars, which will be explained in describing the operations of the machine.

The several heckles are adapted and made to work in the machine by attaching the ends of the respective frames or carriages *b,* to travelling endless chains *e, e,* seen in figs. 1, 2, and 3. These endless chains pass over fluted

guide rollers *f*, *f*, seen best in figs. 2 and 3, and over horizontal bars *g*, *g*, seen best in figs. 1 and 2. The chains with the heckles are driven through the machine by rotatory spur wheels *h*, *h*, see figs. 1 and 2, the teeth of which take into the spaces between the cylindrical parts of the several heckle carriages *b*, *b*, and consequently drive the heckles forward; and these spur wheels are actuated by a train of toothed gear from the first moving shaft *i*, which gives motion to all the operative parts of the machine.

If flax, hemp, long wool, or other fibrous material be passed into the machine at the back part by a feeding cloth or creeper through a guide *k*, best seen in figs. 1 and 2, and be conducted under and over the feeding rollers *l*, *m*, *n*, and over the heckles *a*, *a*, *a*, to the drawing rollers *o* and *p*, and thence to the flyer and bobbin, or to a receiving can, the fibres will be opened in their progress, and combed by the points of the heckles entering into and separating the fibres, the material being drawn by a different speed to that with which the heckles travel.

This operation of preparing, drawing, and roving flax and hemp, and the general construction of a machine of this kind being well understood, it is not necessary to explain its details, excepting as respects those parts which constitute the present improvements.

It will be perceived by reference to figs. 1 and 2, that the knobs *d*, which project from the jointed levers *c*, as they travel along the machine, bear against the outer edges of the two fixed guide bars *q*, *q*, that extend along the top of the machine above the heckles, which keep the heckle points raised as fig. 10. This will also be very evidently seen in the front view of the machine fig. 3, where the upper heckle bar *a*, is raised in its carriage *b*, by the knobs *d*, *d*, bearing against the outer edges of these guide

bars *q*, *q*. But when the endless chains *e*, *e*, which support and conduct the frames or carriages of the heckles have advanced the heckle points to within a very little distance of the drawing rollers (see fig. 2), then the knob *d*, of the jointed levers at each end of the heckle bar, passes the ends of the guide bars *q*, *q*, and they immediately come in contact with two inclined planes *r*, *r*, seen in figs. 1 and 2, which instantly depress the levers *c*, and consequently cause the heckle bar *a*, with its points, to descent in the frame or carriage *b*, withdrawing the points from the fibres of the material almost in a perpendicular direction.

The heckles that have become thus depressed pass with their carriages by the traversing of the endless chains along the under part of the machine, and when they arrive at the back and begin to rise, the guide bars *q*, *q*, being at their commencement slightly bent, conduct the knobs *b*, of the levers *c*, until they are forced back into the positions first described, which raises the heckle points, as they come to the upper part of the machine, into effective operation. The fibres of material operated upon after passing through the drawing process between the rollers, may be roved, twisted, or spun, by the employment of a bobbin and flyer, as shown in fig. 2, or it may be delivered into a can, to be roved, twisted, or spun by other machinery, by substituting a pair of conducting rollers instead of the bobbin and flyer, which shall conduct the sliver of material into a tin can below.

The descent of the heckles *a*, into their frames *b*, by the falling of the levers *c*, *c*, precludes the possibility of the fibres of the material operated upon being carried down under the machine by the points, as frequently happens in gill machines of the ordinary construction; and this mode of mounting the heckles and traversing them with the

assistance of the guide bars *q, q,* and inclined planes *r, r,* allows the heckle points to be brought much nearer to the drawing rollers *o, p,* by means of the metal bars in which the heckle points or needles are set falling below the centre of the endless chain *e, e,* shown in figs. 1 and 2, and thereby affords the means of preparing, drawing, and roving various qualities of flax, hemp, wool, and other fibrous materials, particularly such as have a much shorter staple than any fibrous materials hitherto operated upon in gill machinery.—[*Inrolled in the Rolls Chapel Office, January,* 1833.]

Specification drawn by Messrs. Newton & Berry.

To Robert William Sievier, *of Southampton-row, in the parish of Saint George, Bloomsbury, in the county of Middlesex, gentleman, for an improvement or improvements in the making or manufacturing of elastic goods or fabrics, applicable to various useful purposes.*—[Sealed 17th January, 1833.]

This invention is described by the Patentee in the following manner:—

My invention of an improvement or improvements in the making or manufacturing of elastic goods or fabrics, applicable to various useful purposes, are designed for the production of an elastic web, cloth, or other manufactured fabric for bandages, and for such articles of dress as the same may be applicable to.

The first object which I propose, is to manufacture an article by the ordinary knitting frame, or similar kind of machinery, in which cords or strands of Indian rubber shall be introduced between the loops or stitches of the fabric, for the purpose of forming elastic cords or bands round the

margins or other parts of stockings, socks, gloves, night-caps, drawers, and various other articles of clothing. The second object is to manufacture in the ordinary loom an elastic woollen cloth, by the introduction of cords or strands of Indian rubber among the longitudinal threads or yarns which constitute the chain or warp, and also among the transverse threads or yarns which constitute the weft or shoot, and which cloth shall be capable of being afterwards felted and dressed with a nap. The third object is to produce cloth from cotton, flax, or other suitable material not capable of felting, in which shall be interwoven elastic cords or strands of Indian rubber, coated or wound round with a filamentous material.

The first of these improvements I effect by preparing knitting frames, or other similar machines, in the usual way for the production of the knitted materials called stocking fabric; and when the same are set to work, and the fabric has been manufactured by the ordinary knitting process up to the part at which I desire to introduce the elastic cord or strands, I then, by the adjusting screws of the machine, provide for the elongation or contraction of the lengths of the loops or stitches of the row next to be produced across the machine, in order to form a channel to receive the said elastic cord or strand; and having prepared fine strips of Indian rubber, which may, if desired, be coated or covered with a filamentous material, as described in the specification of my Patent, dated the first day of December, 1831, and inrolled in the Office of the Rolls Chapel of the High Court of Chancery, in June, 1832, I conduct such thread, cord, strand, or strip of Indian rubber by means of a long needle, hook, pincers, or other suitable apparatus answering the purpose of a shuttle across the machine between the row of stitches or loops which were last made, and those which are then about to be formed;

and having drawn the said Indian rubber, thread, cord, or strand, straight and smooth, I complete the last mentioned row of loops or stitches by the ordinary movements of the machine which encloses the Indian rubber, thread, cord, or strand, and keeps it securely in its place interwoven with the threads of the fabric. A second thread of Indian rubber is in like manner introduced between the next or other subsequent row of stitches, and is in the same way confined; and any further number of these threads, cords, or strands, may by the same means be inserted and interwoven into the fabric at such parts as may be required for the purpose of producing (when the selvages are connected or whipped together) elastic bandages, garters, or bracings round the stocking, sock, glove, night-cap, or other article of wearing apparel.

In effecting the second improvement, the production of an elastic woollen cloth, I introduce into the loom among the longitudinal or warp threads or yarns of the intended fabric, longitudinal threads, cords, or strands of Indian rubber, or I constitute the warp entirely of such strands, either covered with a filamentous material or not, as before described; and through or between the warp threads, cords, or strands of warp, I pass the transverse weft or shoot threads or yarns in the ordinary way of weaving, for the purpose of effecting that intervention which produces the cloth; these transverse weft threads being composed in part of the Indian rubber strands, or of the ordinary threads or yarns of the fabric, according as I may wish to produce a cloth which shall be elastic lengthwise only, or in both directions.

If the elastic cloth so produced should be intended for outward garments with a nap upon its surface, I should employ, in connection with the Indian rubber strands, yarns spun from short wool, which, after having been woven, I should finish as the woollen cloths are usually

finished, that is, felt the wool in the fulling stock, raise the pile by gig machinery, or by hand cards or teazles, and afterwards shear the nap down to a fine smooth surface. In manufacturing an elastic cloth from cotton, flax, or other material which is not intended to be milled or fulled, I introduce into the fabric threads or strands of Indian rubber, which have been previously covered by winding filaments tightly round them through the agency of an ordinary covering machine, or otherwise; these strands of Indian rubber being applied as warp or weft, or as both, according to the direction of the elasticity required. By thus combining the strands of Indian rubber with yarns of cotton, flax, or other non-elastic material, I am enabled to produce a cloth which shall afford any required degree of elastic pressure, according to the proportions of the elastic and non-elastic material.

It remains only to add, that the strands of Indian rubber are, in the first instance, stretched to their utmost tension, and rendered non-elastic, as described in my former Specification; and being in that state introduced in the fabric, they acquire their elasticity by the application of heat after the fabric is made.

Lastly, as my invention consists solely in the employment of strands of Indian rubber in connection with yarns, in the way described for manufacturing elastic goods or fabrics, I have not deemed it necessary to describe any particular kind of machinery for carrying the same into effect, as such machinery is well known, and forms no part of my invention.—[*Inrolled in the Rolls Chapel Office, July*, 1833.]

Specification drawn by Messrs. Newton & Berry.

To John Holmes, *of Birmingham, in the county of Warwick, engineer, for his invention of an improvement in metallic shanks for buttons.*—[Sealed 4th May, 1833.]

This invention is described by the Patentee in his Specification as follows:—

My invention of "an improvement in metallic shanks for buttons," consists in raising or forming peculiarly shaped elevations, as loops for shanks in discs or pieces of thin sheet metal, whichare intended to constitute the undersides or backs of buttons; or such shanks or loops may be raised and formed out of discs or pieces of metal, such discs being intended to constitute the whole substance of some description of buttons not requiring a plain face; or these improved shanks may be formed out of thin pieces of sheet metal, distinct from the pieces which constitute the backs of the buttons, and may be soldered or cemented to the said backs, or otherwise attached and combined in various ways with the other parts of the button, whether the faces of such buttons be intended to be, or are covered with Florentine, or other fabric or metal, or are made from pearl-shell, horn, ivory, wood, or other substance.

As the shape or form of my improved shanks may be slightly varied, I shall *first* describe the shank or loop I most prefer, that is, as raised or formed upon the disc of metal which is to constitute the back of the button; and, *secondly*, such variations in the shape or form of these shanks as might be found to answer the purpose; *thirdly*, such constructions of my improved shanks when made separate from the discs or backs as are intended to be used for soldering, cementing, or otherwise attaching to, or combining with, the other parts of the button; *fourthly*,

the tools or punches and dies used to form the said shanks; and, *lastly*, the machinery or apparatus by which I intend to carry my invention into effect: although I do not mean to confine myself to the precise construction of machinery hereinafter described, as the same shaped shanks or loops may be formed out of thin sheet metal, by working the tools, or dies and punches, in a common fly or lever stamping press, or in any other manner.

Fig. 1, in Plate IV., represents the outside appearance of one of my improved shanks, as raised or formed out of the disc of metal, which is to constitute the back of the button: fig. 2, an edge view, looking through the shank or loop; fig. 3, is another edge view, looking at the raised shank or loop endways; fig. 4, is a section taken through the shank and disc in the direction of the dotted line A, B, in fig. 1; and fig. 5, another section taken in the direction of the dotted line C, D, in fig. 1. All these figures of my improved shanks, as well as those hereinafter described, together with the tools used to form the same, are drawn at about half the real size, to show the parts more distinctly.

It will be seen that the shanks or loops *a, a*, are formed by partially cutting and raising, or forcing up a portion of the metal disc or back *b*, and are compressed or formed by the action of the tools, or punches and dies, so as to have a rounded figure on the inside of the top part of the shank, as at *c*, the edges of the metal being turned so as to prevent them cutting the threads by which the button is fastened to the cloth or garment. It will be observed that there being but one passage or way through which the threads can be passed to sew on the button, and that opening being rounded on all edges, will cause the threads to keep in the centre of the shank; the form of the shank allowing a much neater attachment to the garment,

and keeping the threads from the edges of the metal. The ends of the shank or portions *e, e,* which rise up from the disc or back *b,* are made nearly circular, in order to avoid presenting any edges of the metal to the sides of the button hole; and when the shank is sewed on the cloth, it forms, in conjunction with the threads, a round attachment, thereby preventing the shank from cutting or wearing the button hole; the threads, when the shank is properly sewed to the garment, nearly filling up the opening through the shank, and completing that portion of the circle which has been taken out of the shank by the dies in forming the crescented parts of the loop. It will be therefore understood that my intention is, that the inside edges of the shank should be turned as much as possible away from the threads by which the button is sewed on the cloth, and that the outside of the shank should be formed so as to present rounded surfaces to the button hole, and that the thread should fill up the opening through the shank so as to produce a round attachment to the garment. I should here observe, that the backs of the buttons shown in these figures are of the shape generally used for buttons covered with Florentine or other fabric, or faced with plates of thin metal, and are intended to have the edges of a disc, or what is termed a shell, forming the face to be closed in upon the inclined or bevelled edges of the backs.

Having now described the peculiar form of the improved shanks which I most prefer for buttons to be covered with Florentine or other fabric, or shells of thin metal plate, I shall proceed to describe some of the different variations from the same. Fig. 6, is a representation of a shank, the cut through the disc or back being effected by a parallel rib on the die, and corresponding groove in the shaping punch, instead of the semicircular or crescented cut

shown in fig 1; fig. 7, is a view of another shank, the separation of the sides of the loop being performed by straight edges in both punch and die. I prefer finishing this shaped shank (that is, giving it the rounded form, to prevent its cutting the threads) by detached punches and dies or pincers, as will be hereinafter described. Fig. 8, is a representation of one of the improved shanks which has only portions *f, f,* of the back of the button connected to its ends. This shank may be used for buttons which have a metal shell to be closed in upon the bevelled edges of the ends, or the shank piece may be otherwise connected to the face part of the button. Fig. 9, is a representation of a shank raised out of a small disc of metal *g, g,* intended to be soldered to the disc of metal forming the button, or it may be otherwise fixed to the back; fig. 10, is a representation of another shank for the same purpose, having only portions of metal *h, h,* for soldering or otherwise attaching it to the back of the button, as by placing a ring or annular piece over it forming the back, which shall be confined to the face, as before described; fig. 11, is a representation of a shank raised upon a dish or bevelled piece of metal, and is intended to be used for buttons made from pearl-shell, horn, wood, paper, or other substances. The back part of the button has a dove-tailed recess formed in it to receive the dish-shaped back, which is pressed into the recess, the edges of the dish being expanded in the dove-tailed parts of the recess by the ordinary means, and thereby firmly fixing it to the button, as shown in fig. 12.

Having now explained the peculiar forms of my improved shanks, I shall proceed to describe the tools, or punches and dies, by which I cut the disc or back from out of a sheet of metal, and at the same operation produce and form the shank complete. Fig. 13, is a longitudinal section

taken through a pair of dies and punches when separated; fig. 14, is a similar section, taken when they are put together, and in the act of forming a shank after cutting out the disc or back of the button from a sheet of metal; fig. 15, is a face view of the punch; and fig. 16, is a similar representation of the counter die, with the tools complete; *a*, is the punch or cutter, and *b*, the counter bed, by the circular edges of which the disc of metal is cut out of the sheet; *c*, is a die, fixed in the cutter *a*, (upon which the name of the button-maker may be engraved); fig. 17, is a face view of this die when removed out of the punch; *d*, is the counter die to the die *c*. It will be perceived that these dies *c* and *d*, together with the punch and bed, compress the disc of metal into the form required for the back of the button; that shown in the figures, as before stated, is of the shape used for buttons to be covered with Florentine or thin plate metal, in a round shell closed in upon the inclined or bevelled edge of the back; *e*, is the cutting and shaping punch of the shank, which is fixed within the counter die; this punch cuts through the metal of the disc, and forms the shank as the dies approach nearer together, by raising or forcing it up into the recess or opening in the die *c*, where it is met by the end of another shaping punch *f*, fixed in the punch *a*, which compresses the upper part of the shank into the recess *g*, in the end of the punch *e*, thereby giving the shank its rounded figure, and at the same time forming the other part of the shank into the required shape, as described at figs. 1 to 5. The ends of these shaping punches fit into and over each other, as will be seen by the detached figures of the punches designed for forming the shank first described. Fig. 18, is a representation of the punches when apart and removed out of the dies; fig. 19, is a longitudinal section of the same; fig. 20, is another view of the punches as seen on the top. The sharp edge of

the recess *h*, in the punch *e*, comes in contact with the cutting edges of the projecting rib *i*, of the die *c*, and thereby cuts through so much of the metal as is required. The edge *k*, of this die, keeps the outside ends of the shank of a spherical figure, as before explained, while the punches force up the metal, and form the elevated loop or shank: *u*, *u*, are holes made through the counter die *d*, for the passage of clearing pins, which force out the shank or back piece from the counter die when finished, the operation of which will be shown when describing the machinery hereafter. There are adjusting screws at the back of the punches and dies, by which they can be regulated and brought to their proper position one to the other.

Although I have shown the punches which form my improved shanks fixed into and working in conjunction with the punch and dies which cut out and shape the discs of metal for the back of the button, yet I do not intend to confine myself to that mode of using them, as flat blanks or discs for the backs of buttons may be cut out in a separate stamping press, and afterwards shaped in the same press, or in another, and then brought under the operation of the punches which form my improved shanks, fixed in any suitable press. This last-mentioned mode of producing button shanks and backs I should prefer when such metals are employed as require annealing between the operations of shaping the backs and forming the shank. Fig. 21, is a section taken through a pair of dies, in which the operation only of forming the shank is to be performed, the backs being previously shaped in another press. In this instance the punches *e* and *f*, are mounted in guide pieces *m* and *n*, which keep them in the proper position towards each other, the die *c*, being mounted in the piece *n*, and acting against the face of the guide *m*. The blanks or backs of the button may be fed into these dies by hand or

any other means; and after the shank is formed, the finished back can be pushed out of the lower die by clearing rods passed through the holes *u*, *u*, and removed by hand, or in any convenient manner.

When my improved shanks are formed out of iron or other metal which is too brittle to allow of the shank being forced up and finished at one operation in the dies and punches, I prefer cutting out and shaping the blank or back of the button first, and after annealing it, to raise or force up the portion of metal to form the shank into the shape shown in fig. 22, that is, without the edges of the metal being turned to prevent their cutting the threads; and after again annealing it, to bend or turn the edges into the shape shown in fig. 7, by means of suitable punches in another press, or by a pair of pincers and punch, as shown in fig. 23, which is a side view of a small apparatus to be used for turning the edges of the shank by hand, with a partly formed shank seen under operation: *a*, is the upper jaw of a pair of pincers, this jaw being fixed on to the head of the standard *b*; the under jaw *c*, is formed by the end of the lever or handle *d*, which has its fulcrum in the standard *b*; *e*, is a small punch passed through a guide hole in the head of the standard, one end projecting into the jaws of the pincers, the other against a piece *f*, attached by a joint to the lever *d*, and working through a slot in the head of the standard; this piece *f*, has an inclined plane on the side next the end of the punch, which, in its descent, projects the punch forward against the top of the loop of the shank (placed at *g*,) as the pincers are closed by forcing down the lever *d*, and, in conjunction with the jaws of the pincers, compresses the shank into the required form, as shown at *h*, and in the enlarged fig. 7. A spring *i*, acts against a pin fixed into the punch *e*, for the purpose of bringing it back as the jaws open after

forming a shank. Figs. 24 and 25, represent the face and section of the dies mentioned before, for cutting the slits in the discs, as at fig. 6.

Having explained the peculiar forms of my improved metallic shanks for buttons, and the tools employed in making the same, I shall proceed to describe the machinery or apparatus by which I intend to carry my invention into effect. I propose to take a sheet of metal, say about thirty or forty feet long, and of the proper width and thickness, which thin sheet is to be wound upon a roller, and placed above the machine, so that it can be easily drawn down into the machine as required for feeding the punches and dies: fig. 26, is a plan view of a machine intended to work any convenient number of sets of punches and dies placed in rows—eleven sets of punches and dies are represented, each set being constructed as described under figs. 13 to 20; fig. 27, is a side view, and fig. 28, a longitudinal section taken through the machine; figs. 29 and 30, are transverse sections taken through the machine between the punches and counter dies, fig. 29, representing its appearance at the face of the punches, and fig. 30, the opposite view of the counter dies; *a, a,* are the punches, *b, b,* the counter dies, each being mounted in rows in the steel plates *c, c,* fixed upon two strong bars *d* and *e,* by counter-sunk screws and nuts, the punches and dies being retained in their proper position by the plates, which are screwed on to the front of the steel plates, and press against the collars of the punches and dies. The bars *d* and *e,* are both mounted on the guide pins *g, g,* fixed in the heads *h, h,* of the frame, which guide pins pass through the bosses on the ends of the bars. The bar *d,* is stationary upon the guide pins, being fixed to the heads *h, h,* by nuts and screws passed through ears cast on their bosses. The bar *e,* slides freely upon the guide pins *g, g,*

as it is moved backwards and forwards by the crank *i, i,* and connecting rods *j, j,* as the crank shaft revolves.

The sheet of thin iron to be operated upon is placed, as before stated, above the machine, its end being brought down as at a, a, and passed between the guide rod and clearing plate *k,* and between the pair of feeding rollers *l, l,* which, by revolving, draw down a further portion of the sheet of metal between the punches and dies, after each operation of the punches.

As the counter dies advance towards the punches, they first come in contact with the sheet of metal to be operated upon, and after having produced the pressure which cuts out the discs, the perforations of the sheet are pushed on to the ends of the punches by the counter dies; and in order that the sheet may be allowed to advance, the carriage which supports the axles of the feeding rollers, with the guide rod and clearing plate, are made to slide by means of the pin *m,* which works in a slot in the sliding piece *n,* bearing the axis of the feeding roller *l, l,* the slide *n,* being kept in its place on the frame work by dove-tailed guides, shown in fig. 30.

When the counter dies have advanced near to the sheet of metal, the pin *m,* comes in contact with that end of the slot in the piece *n,* which is next to the punches, and forces the carriage with feed rollers and clearing plate, and also the sheet of metal, onwards, as the dies are advanced by the re-action of the cranks; and after they have cut out the discs, and raised the shanks, the sheet of metal will remain upon the punches; and when the bar *e,* returns, the finished backs and shanks are forced out of the counter dies, by the clearing pins and rods *o, o,* which project through the bar *e,* and through the holes before mentioned in the counter dies; these clearing pins being stationary between the bars *p, p,*

mounted upon the standards *q, q,* on the cross bar of the frame, as shown in figs. 26, 28, 29. Immediately after this is done, the pins *m,* come in contact with the other ends of the slots in the pieces *n,* and draw back the feeding rollers *l, l,* together with the clearing plate *k,* and the sheet of metal away from the punches into the position represented in the figures.

At this time the feeding of the metal into the machine is effected by a crank pin *r,* on the end of the crank shafts coming in contact with the bent end of the sliding bar *s,* supported in standards *t, t;* and as the crank shaft revolves, this pin *r,* forces the bar *s,* forward, and causes the tooth or pall *u,* on its reverse end, to drive the ratchet wheel *v,* one or more teeth; and as the ratchet wheel *v,* is fixed on to the end of the axle of one of the rollers *l,* it will cause that roller to revolve; and by means of the pair of spur pinions on the other ends of the axles of the feeding rollers, they will both revolve simultaneously, and thereby draw down the sheet of metal into the machine. It will be perceived that the standards which support the clearing plate and guide bar are carried by the axles of the feeding rollers, and partake of their sliding motion; also, that the clearing pins *o,* are made adjustable between the bars *p,* to correspond with the counter dies. There is an adjustable sliding stop *x,* upon the bar *s,* which comes in contact with the back standard *t,* and prevents the bar *s,* sliding back too far, and consequently regulates the quantity of sheet metal to be fed into the machine by the pall and ratchet wheel, in order to suit different sizes of punches and dies. In case the weight of the bar *c,* carrying the counter dies should wear upon its bearings, the guide pins *g, g,* I have shown small friction rollers *y, y,* under the bosses of this bar, which friction rollers run upon adjustable beds or planes *z, z,* by which means the guide pins

may be partially relieved from the weight of the bar *c*, and the friction consequently diminished.—[*Inrolled in the Inrolment Office, July*, 1833.]

Specification drawn by Messrs. Newton and Berry.

To JOHN REEDHEAD, *of Henry-street, Vauxhall, in the parish of Lambeth, in the county of Surrey, engineer, for his invention of certain improvements in the construction of coaches, waggons, or other carriages used for the transporting or conveying goods and passengers, to be drawn by horses or propelled by steam or other motive power.*—[Sealed 29th January, 1833.]

THIS invention of certain improvements in the construction of coaches, waggons, or other carriages, consists in the novel construction and arrangement of the fore-parts of the carriage, whereby the locking of the fore-wheels is effected with greater ease and certainty than in the common construction of carriages; and also in the manner of mounting the wheels of the carriage, each wheel having a short axle of its own, and supporting the carriage upon anti-friction rollers, by which means the ordinary friction is much reduced; and, further, in adapting a friction break or drag to the wheels, for the purpose of retarding the progress of the coach in going down a hill.

Plate V., fig. 1, is a plan or horizontal view of the fore-part of a carriage constructed in this improved manner, intended to be drawn by horses, showing the fore-wheels in their position when running in a straight course: fig. 2, is a

similar view, showing the wheels as locked when in the act of turning; fig. 3, is a front end elevation of the same; fig. 4, is a section taken through the centre of the fore-axletree; and fig. 5, is a side elevation of the general appearance of a stage coach, with the improvements appended: *a, a,* are two splinter bars, with their roller bolts for connecting the traces of the harness; these splinter bars are attached by the bent irons *b, b,* to two short axletrees or axle-boxes *c, c,* which carry the axles of the fore-wheels *d, d,* and turn upon vertical pins or bolts *e, e,* passed through the fore-axletree *f,* the splinter bars and axle-boxes being mounted so as to move parallel to each other, the latter partaking of any motion given to the splinter bars by the horses in drawing the carriage forward, and thereby producing the locking of the wheels, as shown in fig. 2; and in order that the two wheels and their axles and axle-boxes, together with the splinter bars *a, a,* may move simultaneously, the latter are connected by pivots to the end of the links or levers *g, g,* which are attached to the arms *i, i,* that receive the pole of the coach by a hinge joint or pin *h*; the arms *i, i,* turning on a vertical fulcrum pin *k,* passed through the main axletree *f,* as the pole is moved from one side to the other.

The axles *o, o,* are firmly fixed into the naves of the wheels, as represented in the side view of a wheel detached at fig. 6, the axles being mounted so as to revolve within their boxes in the following manner:—The axle-boxes, which answer the purpose of short axletrees, are formed of iron, and consist of one main or bottom plate *l,* seen best in figs. 4 and 7; upon this bottom plate is formed the chamber *m, m,* carrying the two anti-friction roller *n, n,* which turn on short axles passed through the sides and partition at the upper part of the chambers. These anti-friction rollers bear upon the cylindrical parts of the axle *o,*

of each wheel, and support the weight of the coach; *p*, is a bearing firmly secured in the axle-box to the plate *l*, for the end of the axle *o*, to run in, the axle being confined in its proper situation by a collar and screw nut on its end; *e*, is the vertical pin or bolt before-mentioned, upon which the axle bar turns when the wheels are locking, and which bolt is enlarged within the box, and has an eye for the axle to pass through, being firmly secured to the plate *l*, and also to the sides of the box. Fig. 7, is a plan or horizontal view of an axle and its box belonging to one of the fore-wheels; a piece *q*, is fixed on the underside of the main axletree, which supports the ends of the plates *l*, and thereby relieves the pins *e*, *e*, of the strain they would otherwise have to withstand. The axles of the hind-wheels are mounted upon similar plates *l*, *l*, with bearings and chambers with anti-friction rollers, but as these are not required to lock, the plates *l*, *l*, are fixed on to the under-side of the hind axletree by screw nuts; there are small openings or doors, which can be removed for the purpose of unscrewing the nuts and collars of the bearings *p*, when the wheel is required to be taken off the carriage, when the axle can be withdrawn from the boxes. If it should be thought necessary, other chambers with friction rollers may be placed on the under-side of the plate *l*, to bear up the end of the axles, and relieve the bearing *p*. In order to stop or impede the progress of a carriage in passing down hills, there is a grooved friction or brake-wheel *t*, fixed by clamps or otherwise on to the spokes of one of the hind-wheels; *u*, is a brake band or spring of metal encircling the friction wheel, one end of which band is fixed into the standard *v*, upon the hind axletree, and the other end connected by a joint to the shorter end of the lever *w*, which has its fulcrum in the standard *v*; this lever extends up to the hind-seat of the coach, as shown in

fig. 5, and is intended to be under the command of the guard or passengers of the coach, and when descending a hill, or on occasion of the horses running away, the longer end of the lever is to be depressed, which will raise the shorter end, and consequently bring the band or spring *x*, in contact with the surface of the friction wheel, and thereby retard its revolution, and prevent the coach travelling too fast; or instead of attaching the friction brake to the hind-wheel, as represented in fig. 5, it may be adapted to the fore-wheels, and the end of the lever brought up to the side of the foot-board, or under it, and within command of the coachman, the standard which carries the fulcrum being made to move upon a pivot to accommodate the locking of the wheels. It will be observed that by these improved constructions of the carriage, and mode of locking, the Patentee is enabled to use much larger fore-wheels than in common, and that the splinter bars will always be in the position of right angles with the track or way of the horses in drawing the carriage, by which they are much relieved, and always pull in a direct and equal manner.—[*Inrolled in the Rolls Chapel Office, July,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To Benjamin Cook, *of Birmingham, in the county of Warwick, brass-founder, for his having invented an improved method of manufacturing various useful articles from a metal not hitherto used for that purpose.*—[Sealed 13th April, 1832.]

The invention specified and claimed under this Patent, is the making or manufacturing of a great variety of articles

of domestic and other uses out of sheet or rolled zinc, which is to be worked into the different shapes required in the way that other metals are treated in making similar articles; but the Patentee recommends that the sheet or rolled zinc should be worked at a temperature of about 76°, or summer heat; and he has appended to his Specification a long schedule of the articles intended to be made from zinc, which comprises every thing usually made at Birmingham and Sheffield in silver, brass, copper, or plated goods, but which it is quite unnecessary for us to insert in this Journal.—[*Inrolled in the Inrolment Office, October*, 1833.]

Specification drawn by the Patentee.

To GEORGE FREDERICK MUNTZ, *of Birmingham, in the county of Warwick, metal roller, for an improved manufacture of bolts and other the like ships' fastenings.*—[Sealed 17th December, 1832.]

THE Patentee states in his Specefication, that the nature of his invention consists in making bolts and the like other ships' fastenings from an alloy of zinc, or zinc and copper, in such proportions and qualities, as while it enables the manufacturer to roll and work the said compound metal into bolts and other ships' fastenings at a red heat, whereby the said fastenings are less difficult to work, and, consequently, cheaper to manufacture, which improvements also renders the bolts and other ships' fastenings less liable to oxydation, and, consequently, more durable than those ordinarily used: and he then proceeds to describe the

manner in which he intends to carry his invention into effect, as follows:—He first takes that quality of copper known in the trade by the appellation of "best selected copper," and that quality of zinc known in England as "foreign zinc," and melts them together in the usual manner in any proportions between 50 per cent. of copper to 50 per cent. of zinc; and 63 per cent. of copper to 37 per cent. of zinc; both of which extremes, and all intermediate proportions, will roll and work at a red heat; but as too large a proportion of zinc renders the metal too hard when cold, the Patentee prefers the alloy to consist of 60 per cent. of copper to 40 per cent. of zinc. This compound is cast into ingots of any convenient weight, and then heated to a red heat, and rolled and worked while at that heat into bolts and other the like ships' fastenings, in the same manner as copper is usually rolled or worked, only taking care not to overheat the metal so as to produce fusion, and not to put it through the rollers, or work it after the bars get too cool, that is, when the red heat has gone off.

It is evident that the said alloy may also be made from a compound of copper and calamine by cementation, taking care that the quantity of calamine shall be such that the zinc extracted from it will be in some of the same proportions to the copper, as before-mentioned; but as it is very difficult to make the copper take up the necessary quantity of zinc by this process, it is more expensive. It is equally evident that brass of very good quality, with the addition of zinc, requisite to make the proper proportions of copper and zinc, will likewise roll and work hot, and answer the purpose, but it is a more expensive mode.

The Patentee states, in conclusion, that he claims as his invention the manufacture of bolts and other the like ships' fastenings of an alloy of copper and zinc, as aforesaid, in

such proportions as will enable the manufacturer to roll or work the said alloy while at a red heat into bolts and other ships' fastenings, which are more durable and more cheaply manufactured than copper bolts, at the same time that they are less liable to corrode.—[*Inrolled in the Inrolment Office, June,* 1833.]

To Jacob Perkins, *of Fleet-street, in the city of London, engineer, for an improvement in preserving copper in certain cases from the oxydation caused by heat.*—[Sealed November 20th, 1832.]

This invention relates to the preservation of the copper tubes used in steam boilers, particularly such as are now employed on the Liverpool and Manchester rail-roads; in which boilers, the flues from the fire-box or furnace consist of a number of small copper tubes, through which the heat, fumes, and vapours, pass to the chimney, and it has been found that these tubes become quickly destroyed by oxydation. The Patentee states, that his improvement consists in coating the parts of such copper tubes directly acted on by the heat with an alloy, or mixture of copper and zinc, by which means such copper tubes will be greatly preserved from the effects of oxydation produced by heat; and he then describes the means which he uses for coating such tubes, either on the outer or inner sides; and although he has particularly mentioned the tubes used in boilers similar to those employed on the Manchester and Liverpool rail-roads, which have their inner surface exposed to the action of the heat and vapours arising from the furnace, yet the same effect will be produced in coating tubes on their outer surfaces, when they are used in boilers

which have the water on the inside, and the fire acting on the outer surfaces. He mixes about two-thirds of copper with about one-third of zinc, by melting (these being the proportions he prefers); but he does not confine himself thereto, as the same may be varied.

With this mixture he coats the surfaces which are to be directly acted on by the heat and vapours, by bringing the surfaces, whether the exterior or interior surface so to be coated, in contact with a quantity of the melted alloy aforesaid, and keeping them in contact till the melted metals or alloy adhere all over those surfaces of the copper tubes which are to be directly acted on by the heat; or this coating may be effected in a similar manner as is practised in joining the two edges of the copper in making the copper tubes, taking especial care that there is a thin coating over every part of that surface of the tube which is to be directly acted on by the heat.

The Patentee states, that he claims as his invention, the coating copper tubes in steam boilers with a mixture or an alloy of copper and zinc, as above described, and thus greatly preserving them from oxydation caused by heat.—[*Inrolled in the Inrolment Office, May,* 1833.]

To JOHN HOWARD KYAN, *of Gillingham-street, Pimlico, Esq. for an improved mode of preserving paper, canvass, cloth, and cordage for ships, and other uses; and the raw materials of hemp, flax, or cotton, from which the same may wholly or in part be made.*—[Sealed September 22d, 1832.]

THE nature of this invention consists in steeping the various manufactures and materials named in the above

title in a solution of deutochloride of mercury in water; and the Patentee describes his method of performing his invention in the following manner:—Having prepared or constructed a large tank or reservoir of wood or other suitable material, it is filled to about two-thirds with deutochloride of mercury, or, as it is more commonly called, corrosive sublimate, dissolved in hot or cold water, in the proportion of one pound of sublimate to five gallons of water, and into this liquid is placed the said manufactures and materials, they being kept completely covered by the liquid, and steeped in it for various periods, according to the nature and substance of the manufacture or material, the object being, that a complete saturation should take place; for instance, a thin piece of calico cloth may be left in the liquid for one day, while a thick piece of canvass should remain a week, and cordage proportionably longer: the raw materials also will be subject to the same rule of complete saturation. When the manufactures or materials are removed from the tank or reservoir, they should be first thoroughly dried, and then they may be washed in any number of waters, hot or cold, to remove any portion in excess of the deleterious matter which may be supposed to remain in them; for the action of the deutochloride having once taken effect upon the matter which promotes decay, a chemical change is effected in it, which no subsequent washing can destroy, and which renders the longer presence of any deleterious matter quite unnecessary.

The Patentee states in conclusion, that he claims as his invention the preservation of paper, canvass, cloth, and cordage for ships and other uses, and also the preservation of the raw materials of hemp, flax, or cotton (from which the same may wholly or in part be made), from decay, by immersing and steeping or saturating the same in or

with a solution of corrosive sublimate in water, and thus submitting that matter contained in the said manufactures and materials which most promotes decay, to the action of deutochloride of mercury as herein-before described.—[*Inrolled in the Inrolment Office, March,* 1833.]

To William Ranger, *of Brighton, in the county of Sussex, builder, for a cement or composition, which he denominates Ranger's artificial stone.*—[Sealed December 4th, 1832.]

This cement or composition is intended to form blocks or masses of artificial stone, to be used in the construction of buildings in place of brick or stone, or in union with either, or both of them, and it is composed of silicious or other fit and proper hard and unchangeable matters, of powdered lime in its pure or caustic state, and of water boiled or heated, and to be used as hot as conveniently may be in mixing the different ingredients. The Patentee likewise occasionally dissolves a portion of sulphate of iron, such as that procured in the neighbourhood of Dorking or Reigate, in the county of Surrey; also grey stone-lime, lime from blue or yellow lias, or any other lime which is fit and proper for the purpose, which is employed in the state of a dry powder, not slacked as usual.

The silicious or other hard materials or matters may be such as are commonly employed; for instance, river or sea sand, skreened shingle from the sea-shore or beach; the latter should be well washed in fresh water, to free them from sea salt; broken flints may be employed, as also freestone, copper slag, or other fit and proper materials of similar natures. Any or either of these substances, as

well as the lime, is to be separated or reduced into finer or coarser parts, either by hand, or by the employment of machinery similar to that used in making Roman cement, or any other which is fit and proper for the purpose, agreeably to the nature of the artificial stone the materials are intended to form. The following preparation the Patentee generally prefers, videlicet,—silicious or other hard materials or matters, thirty pounds; powdered lime, three pounds; and boiling or hot water, either containing or not the above matters in solution, one pound twelve ounces. These proportions may, however, be occasionally varied; but the Patentee states, that he has found them to answer well in practice, and when mixed, they are to be put into moulds and left to harden: no more of these materials should be mixed at once than will be sufficient to fill the mould, as the setting or concreting action begins to commence instantly they are put into the mould; and, in general, the mass of artificial stone becomes sufficiently firm, in the course of about ten minutes, to admit of the sides and ends of the mould being removed, and the block left upon the bottom of it, ready to be taken away to dry and harden, which will be in the course of a fortnight, and then the block or mass will be fit for use.

In filling the moulds, the materials should be carefully rammed close, in order to expel the air; and any excess may be removed by passing a straight iron bar or scraper along the top of the mould; any interstices or cavities left in the face of the block may then be filled with materials of a finer consistency. The moulds will, of course, vary in their forms and manner of framing them, according to the shapes intended to be given to the masses or blocks of artificial stone; for instance, whether they are to be plain or moulded in flutings, or otherwise ornamented or decorated; or whether to be square, circular, or of any

other shapes. As, however, it may be desirable to give some idea of the construction of the moulds, we have shown in Plate V., figs. 8 and 9, two views of one of the wooden moulds, intended to form plain oblong blocks of artificial stone; *a*, is the bottom of the mould, resting upon, and strengthened by, the two cross pieces *b*, *b*; *c*, *c*, are the sides of the mould, each having two upright grooves *h*, *h*, formed in them (shown best in the plan view, fig. 9), to receive and retain the ends *d*, *d*, of the mould in their proper situations. The sides and ends are held together by means of iron bars *e*, *e*, the ends being bent at a right angle so as to form clamps, between the inner ends of which clamps and the sides of the mould, wooden wedges may be tightly driven, to hold the mould together when in use, and can be as easily removed again when it is to be taken asunder. There are two ledges *f*, affixed upon the bottom of the mould, to retain the sides and ends of it steadily in their places upon it when in use.

The Patentee prefers placing the blocks or masses of his artificial stone in the open air to harden, and even to wet them occasionally during that operation; and states in conclusion, that he does not intend to claim as his invention the use of hot water in mixing mortar for building with; but he does claim as his invention the employment of boiling or hot water in combination with dry powdered caustic lime, and silicious or other hard matters, in the manner and in the proportions herein-before described, and as essential to the forming of the above blocks or masses of artificial stone.—[*Inrolled in the Inrolment Office, June,* 1833.]

To John Myatt, *of Tabernacle Walk, Finsbury-square, in the county of Middlesex, tailor, for his invention of an article to be worn on the feet as a substitute for pattens or clogs, which he denominates "Myatt's Health Preserver."*—[Sealed 27th September, 1831.]

The "Health Preserver," described by the Patentee in his Specification of the above patent, is improvements in the construction of the common patten and the French clog, now commonly used in this country, and consist in the introduction of a spring placed in the sole of the clog, for the purpose of keeping the clog upon the feet without any strap or tie over the instep; also in a peculiar construction of the ring or iron of pattens, by which it is rendered elastic, or yielding to the tread of the wearer; which improvement is effected by a spring connected to it, which gives way when the fore-part of the ring touches the ground in walking, before the pressure of the foot or weight of the body is thrown upon the patten or clog, and, we suppose, is intended to prevent the noise made by pattens of the old construction, and also to yield in some degree to the bend of the foot, and relieve it of the confined pressure.

Fig. 10, Plate V., is a side view of a clog with the improvement applied, and fig. 11, is a plan view of the same; *a,* is the sole, which is separated from the heel part *b,* but is connected to it by a piece of metal *t,* which is screwed on to the heel, and has a spring coiled round it, as shown in the detached figure 12, which is a view of the piece of metal and its spring removed out of the clog; *c,* is the piece of metal, which with its spring is kept in the sole part of the clog by a metal box or case screwed on to it; *d,* is a cap piece, for the purpose of keeping the clog on the foot of the wearer; *e,* is the guard piece for the heel. It

will be perceived that these clogs can be put on the feet by a shoe-horn, and do not require any tie or fastening over the instep to keep them on the feet, the spring allowing the sole part to be drawn away from the heel, and the clog thereby elongated; and when on the feet the spring will bring both parts towards each other and fit tight upon the feet of the wearer. Fig. 13, is a side view of one of the improved pattens; *a*, is the fore-ring, which turns upon a joint fixed on to the sole of the patten at *b*; *c*, is a spring screwed on to the under-side of the sole of the patten, which gives way to the pressure of the foot in walking; *d*, is a stop piece, upon which the back part of the ring rests when the weight of the body is thrown upon the patten.—[*Inrolled in the Inrolment Office, November*, 1831.]

To JOSEPH SAXTON, *of Sussex-street, in the county of Middlesex, mechanician, for his invention of certain improvements in propelling carriages, and in propelling vessels for inland navigation.*—[Sealed December 20th, 1832.]

THIS invention is stated by the Patentee to consist in the application of pulleys of different diameters, which he calls "Differential Pulleys," or of a pulley and wheels according to the principles hereafter described, whereby he is enabled to take advantage of the results which are obtained from such difference of diameter, by obtaining considerable velocity to carriages, or to vessels used in inland navigation, whilst the rope by which the motion is produced, is caused to act through a small space, in proportion to the distance travelled by the carriage, or by a vessel used in inland

navigation, as will be described hereafter. Plate III., fig. 12, represents a combination of two pulleys, their diameters being as six to seven, *a*, being the larger pulley, and *b*, the smaller one; *c*, *d*, is an endless rope, passing over the sheaves *e*, *e*, and is passed once round each of the pulleys *a* and *b*, that is to say, the part *c*, taking a turn around the larger pulley *a*, and the part *d*, taking a turn around the smaller pulley *b*. If, then, the rope *d*, be caused to move in the direction of its arrow, it will have a tendency to draw the lower part of the pulley *b*, in the same direction with the rope *d*; meanwhile the part *c*, of the endless rope will be moving in the direction of the other arrow, and will have a tendency to move the lower part of the pulley *a*, in the same direction with this part of the rope; consequently, the two pulleys *a*, *b*, they being fixed together, would turn on the mean point *f*, as a fulcrum; *g*, is the centre of the two pulleys. Let it then be supposed, that the part *d*, of the endless rope be moved from *h*, to *i*, it will be evident that the centre *g*, of the differential pulleys *a*, *b*, would be moved to the point *j*, and, consequently, if any object were connected to the centre *g*, of these differential pulleys, it would be propelled from *g*, to *j*, by the endless rope *c*, *d*, being moved the much smaller distance of *h*, to *i*, as is shown by the dotted lines; and these distances will be as thirteen to one.

Having described the principles on which the differential pulleys act, the various applications hereafter described will be readily understood.

Fig. 13, represents these improvements applied to a carriage for the conveyance of passengers on a rail-way; *a* and *b*, are the differential pulleys, *a*, being the larger pulley, and *b*, the smaller one. These pulleys are placed on an axis *g*, (see fig. 14), which represents the pulleys, together with the parts in which they are placed; *m*, is an

arm or frame, which carries the pulleys, and which is fixed to the carriage, as shown at fig. 13, the arm *m*, being cylindrical, and capable of turning in bearings *n*, *n*, affixed to the carriage. The object of this turning of the arm *m*, is to permit the pulleys *a*, *b*, to stand at an angle, by which the endless rope may be led into the sheaves, when the carriage is going in a curved direction. The projecting arm *m*, is forked at the outer end, as shown in figs. 13 and 14, at *o*, *o*, and the forked ends serve as bearings to the axle *g*, of the differential pulleys, the pulley *a*, being permanently affixed to the axle *g*, whilst the pulley *b*, is capable of turning loosely on this axis when it is not retained by the pin or bolt *q*, which locks the two pulleys *a* and *b*, together at the times required, and thus they are, at such times, the same as if they were permanently attached to each other: the object of thus having the means of disconnecting the two pulleys *a* and *b*, is, that by disconnecting them, the power will no longer tend to drive the carriage, as will be fully described hereafter; *r*, fig. 13, is a lever, turning on a fulcrum *s*, the bearing of which fulcrum is attached to the carriage. The upper end of this lever *r*, is formed into a handle, and is in such a position, that a person sitting in front of the carriage may have it under his controul: the other end of the lever *r*, that is, the part below the fulcrum, has a clutch, which receives the flanch *t*, of a sliding socket *t*, within it, as shown at fig. 13; this socket slides on the arm *m*, according as the lever *r*, is moved out from, or is drawn towards the carriage; *u*, is a cranked or bent lever, having its fulcrum at *v*, on the forked frame *m*, *o*, as shown in fig. 13. One end of this cranked lever *u*, has a clutch, which receives the flanch *t*, of the sliding socket, see fig. 14, and the other end of the bent or cranked lever *u*, has also a clutch therein, by which it is enabled to slide the socket *w*, on the axis *g*, backwards

and forwards; *x*, is an arm affixed to the sliding socket *w*, through which the bolt or pin *q*, passes; and this pin or bolt also passes through one of the spokes of the wheel or pulley *a*, and when it protrudes beyond the pulley *a*, it passes between the spokes of the pulley *b*, and, consequently, when the pin or bolt *q*, comes in contact with one of the spokes, or the part of the inner rim of the pulley *v*, where it has been cut away (as shown in fig. 13), the two pulleys will be held securely together. On to the bolt *q*, is placed a spiral spring, its object being, that in case the lever *r*, be moved for the purpose of forcing in the bolt *q*, at a time when it is not opposite the part of the inner rim which is cut away, the spiral spring will have a tendency to force in the bolt, yet at the same time will not offer sufficient resistance to prevent the turning of the pulley, and the bolt *q*, will be forced in, when the part of the pulley where it is cut away comes opposite to the bolt; at the same time there is a spring to prevent a sudden concussion.

In fig. 13, *c d*, is the endless rope, supported at proper intervals of the road by sheaves, to prevent the rope falling on the ground; this endless rope passes around a rigger at each end, and is kept sufficiently tight, one of the riggers around which the rope passes being placed in bearings capable of being slided in the direction of the length of the rail-way on which the carriage travels, and by means of weights attached to a rope or chain, and passing over a pulley affixed at the top of a well, whereby the endless rope *c*, *d*, will be kept sufficiently tight to prevent it sliding on the differential pulleys *a*, *b*.

Having now described the various parts shown in figs. 13 and 14, the Patentee proceeds to describe the manner of their action. If the bolt or pin be passed through the two pulleys *a* and *b*, and the endless rope *d*, be moved in the direction of the arrow, a similar action will take place

to that described in fig. 12; that is, the carriage being attached to the centre *g*, of the differential pulleys *a* and *b*, will be propelled forward on a rail-way with a much greater velocity than the rope travels; and the distance so travelled by the carriage, in comparison with the distance through which the rope moves, will depend on the difference of the diameters of the pulleys *a* and *b*.

In order to prevent the two parts of the rope rubbing against each other, in leading on and off the differential pulleys, the axis *g*, of these pulleys is placed at an angle, a little varying from a right angle with the direction of the motion of the carriage.

Figs. 15 and 16, show two applications of these improvements, but in these figures the applications somewhat vary from that shown in fig. 13; for in these instances, there is only one pulley, whilst the two front or two back wheels of the carriage act the part of the other pulley.

In fig. 15, *a*, is one of the front wheels of the carriage, which also acts as the larger pulley; *b*, is the smaller pulley, and is the only one around which the rope *c, d*, passes, the wheels *a*, and the pulley *b*, being on the same axis *g*, which runs from side to side of the carriage, and turns in bearings affixed to the carriage.

In this arrangement, the point *f*, at which the wheels touch the rail, becomes the fulcrum on which the wheel *a*, turns; and it will thus be evident, that if the rope *c, d*, be drawn forward in the direction of the arrow, a similar effect will be produced as described in fig. 13; yet at the same time, if the wheels and pulleys *a* and *b*, be of the same relative diameters as those in fig. 13, the carriage at fig. 15, would only be propelled at the velocity of seven to one, owing to the fulcrum, at which the wheels *a*, turn, being removed from the mean point *f*, (fig. 12,) between the two diameters, and placed at the extreme end of a radiating

line, drawn from the centre of the wheel *a*, to the point at which it touches the rail-way.

In fig. 16, the rope is passed around the pulley *a*, which is the larger, whilst the carriage wheels act the part of the smaller pulley *b*, the pulley *a*, and the wheels *b*, being on the same axis *g*.

In order that the pulleys in this arrangement may stand at an angle for clearing the rope, the axle *g*, is formed of three parts, connected by universal joints, and one of the wheels *b*, thus travels a little forwarder than the other, and thus the rope will clear itself; and it should be observed, that in both these arrangements, the pulley around which the rope passes is to be made capable of being disconnected from revolving with the axle, as described in figs. 13 and 14. In the arrangement fig. 16, the fulcrum *f*, on which the wheels turn, is the point at which the wheels *b*, touch the rail or road; and the difference in the arrangements, figs. 15 and 16, is, that the power in fig. 15, is applied by the rope between the fulcrum *f*, and the centre *g*, of the wheels or pulleys *a*, *b*, where the weight to be drawn is attached; whilst in fig. 16, the fulcrum is between the centre of the pulley and wheels *a*, *b*; consequently the arrangements differ in the order of leverage, and in this instance the velocity will be as six to one.

In these two last arrangements the rope *c*, *d*, may be either an endless rope, as described in figs 12 and 13, or the rope may be single, and taking a turn around the pulley *a*, or *b*, is to be wound on and off a drum at each end of the distance, which is to be run by one length of rope.

Having described these improvements as applicable to the propelling of carriages, the Patentee proceeds to describe their application to the propelling of vessels in inland navigation, as is shown in fig. 17. This application is an arrangement similar to that shown and described in figs.

13 and 14; *a*, is the canal barge or boat, having an upright standard *b*, affixed on one side thereof; at the top of this standard, the bearings *c*, *c*, are formed to receive the projecting arm *d*; in other respects, the parts are similar to fig. 13.

At proper intervals, sheaves are placed on standards at the side of the canal or river, to support the rope *c*, *d*, as shown in these figures. The same description given of figs. 12 and 13, applies to the propelling of vessels.

The power to be employed for causing the rope *c*, *d*, to be moved, may be varied according to circumstances; for instance, by attaching a horse or horses, according to the power required, to the rope *c*, *d*, and causing it to move slowly, a very considerable velocity will be obtained to the carriage, or to the barge or vessel, as above described; or the power may be derived from a fixed steam engine, or water wheel, or manual labour; and, in order to have perfect controul over the carriage or vessel, and be able to stop it at any time, although the rope is continuing to move, it will be necessary to separate the two pulleys *a*, *b*, by withdrawing the pin or bolt *q*; the power will then no longer act to propel the carriage or vessel, and, consequently, there will only be the momentum already obtained by the carriage or vessel to be overcome, and this, in carriages, may be effected by aid of a brake on any of the running wheels *k*.

The Patentee states, in conclusion, that he is aware that endless ropes, as well as drag ropes, have been before known and used for the purposes of propelling carriages and vessels; but in such cases the carriage or vessel travels only at the same rate of speed with the rope; therefore, the use of an endless rope or drag rope forms no part of his invention, and are only necessary means for effecting the object of this invention, as above described; and con-

fines his claim of "improvements in propelling carriages, and in propelling vessels for inland navigation," to the application of the differential pulleys, or of a pulley and wheels *a, b,* for propelling carriages and vessels, as above described; whereby he is enabled to take advantage of the results which are obtained from the difference of their diameters, and thus obtaining considerable velocity to such carriages and vessels, whilst the rope by which the motion of the carriage or vessel is produced, is caused to act through a very small space, in proportion to the distance travelled by the carriage or vessel, as above described.—[*Inrolled in the Inrolment Office, June,* 1832.]

To Christopher Piggott Bancks, *of Bewdley, in the county of Worcester, brass founder, for his invention of an improvement in the manufacture of certain culinary and chemical utensils and vessels.*—[Sealed 29th June, 1833.]

This improvement in the manufacture of certain culinary and chemical utensils and vessels, consists in a method or methods of protecting or strengthening such vessels when made or formed of zinc, or a mixture or compound of zinc and tin, both of which will melt, run, or fuse, when submitted to the action of a low degree of heat, such utensils being vessels of capacity, and intended to be submitted to the action of fire in boiling liquids, or to be used for any other similar purpose where they are likely to be injured by heat. The improved mode described by the Patentee of strengthening and protecting such vessels, consists in casing

or covering them either wholly or partially with thin sheet copper, iron, tin-plate, brass, or any other metal which will answer the purpose, either soldered or riveted to the vessels, and which is performed in several different ways: that which he most prefers for vessels of small capacity is first described in the following manner:—He first makes or constructs a shell or outer casing from thin sheet copper, iron, tin-plate, brass, or other thin sheet metals, of the proper size and shape required, either by hammering, stamping, or raising, or by uniting the sides and bottom by riveting, soldering, or otherwise; the inside of this shell or outer casing is then covered with tin when in a state of fusion; he then places into the tinned shell or case a core, suspended or placed in such a way as to leave a small space all round it between the surface of the core and the inside of the case or shell, the width of the space being of the thickness of metal required to form the vessel. He then runs or casts into the space, zinc (or any mixture of zinc with a small proportion of tin) in a state of fusion, which fluid zinc or metal will melt or fuse the tin on the inside of the case or shell, and cause it to act as as a solder or flux between the zinc or compound of metals and the shell or casing, and cause the two to adhere firmly together; or, instead of tinning the inside of the case or shell, thin sheet tin or tin foil may be placed in contact with the inner surface of the shell, and then the fluid zinc run into the space, the tin being used or intended to form a flux or solder to promote the union of the zinc, or mixture of zinc and tin, with the case or shell; and after the zinc has become cold and hard, the core is removed, and the inside of the vessel turned to produce a smooth surface in the usual way, and then the handles, spouts, or other outer parts, may be attached by rivets in the ordinary manner.

When constructing vessels of larger capacity, the contraction of the thick body of zinc in cooling would cause it to be drawn away from the inside of the case or shell; he therefore, when constructing such vessels, casts the zinc into the proper shape required, separate from the shell or outer case, and after preparing its outer surface by turning, he covers it with a coat of tin, and then places it into the shell, also previously tinned on the inside, both the vessel and the shell being made hot enough to fuse the tin, which, on cooling, will cause them to adhere firmly together; or, instead of tinning the surfaces, tinfoil may be used as above stated; or, instead of casting the vessels separate from the shell, he sometimes constructs them out of rolled sheet zinc, or sheets of a compound of zinc and tin, as above described, and unites the parts by solder, or otherwise, and then tins the outside, and places them within the case or shell, or uses tinfoil as above described. His intention in thus strengthening or protecting vessels of capacity when made of zinc, or any mixture of zinc and tin which will melt or fuse at a low degree of heat, is to prevent the melting or burning of the vessels at the parts where the handles or spouts are attached to them, which has hitherto been the case in vessels made of zinc, and has therefore prevented their use in common. He therefore sometimes makes his improved vessels with only a broad hoop of thin sheet copper, or other metal casing placed round the upper part of such vessel, and unites it to the zinc by tinning or soldering, or by rivets, as may be thought best, as shown in fig. 14, Plate V., which is a view of an ordinary-shaped stewing-pan, *a*, being the zinc vessel, and *b*, the rim of sheet copper or other metal, which hoop of copper or other thin sheet metal will sufficiently protect the vessel, and prevent it melting at the part near the handle, unless submitted to a greater degree of heat than necessary; and after these hoops are connected to the vessels, he attaches the handles, spouts, &c. to the

vessel, by rivets passed through both the zinc and the thin metal in the ordinary manner.

Having described the nature of his invention and the manner in which it is to be performed, the Patentee states in conclusion, that he wishes it to be understood that he does not mean or intend to claim as his invention any of the parts which are old, or have been before used, or any of the parts separately; but he claims as his invention, as an improvement in the manufacture of certain culinary and chemical utensils and vessels, the strengthening and protecting such vessels, by the outer casing in the manner above described, when such vessels are formed of zinc, or a mixture of zinc and tin, which will melt or fuse at a low degree of heat.—[*Inrolled in the Inrolment Office, August,* 1833.]

Specification drawn by Messrs. Newton and Berry.

PROCEEDINGS ON THE BILL TO FURTHER AMEND THE LAWS RESPECTING

LETTERS PATENT FOR INVENTIONS, &c.

In our last Number we gave an account of the proceedings in the House of Commons on the proposed Bill for amending the Laws relative to Patent Inventions, as far as it had been under discussion, and then stated, that "the Bill was not yet in that state in which it ought, or indeed could be allowed to pass into a law;" and we are glad to see that the same opinion was entertained by the first lawyers in the kingdom; and although we expressed a hope that there would be at least some points of importance passed through the House of Lords, and become the law of the land before the session of Parliament closed, yet we could not help feeling pleased upon hearing the speech of the Lord Chancellor, in answer to a question put by the Mar-

quis of Clanricarde, in the House of Lords, upon this subject. We now confidently look forward to the next session, when something will be done in this important measure, and we fully expect that the Bill to be brought forward by Lord Brougham will (although it may not meet the view of every one) be far better than the mutilated fragment which was proceeding in the House of Commons. We sincerely congratulate our friends and patentees in general, on the prospect of at last gaining what they have so long and anxiously looked for, and has been so much wanted.

It cannot be expected that Lord Brougham can spare enough of his valuable time to go into the merits of every paper or opinion upon this measure, and we therefore consider it our duty to lay before his Lordship, in an epitomised form, all the information we can obtain upon the subject; and we sincerely hope that all parties interested in the matter, will continue their unremitted exertions, and get together all the information possible. We shall not rest idle, and shall be happy to receive communications upon this most important measure; and, in order that our readers may be put in possession of all the necessary information, we have printed the proceedings in the House of Lords, which has been expressly and fully reported for this Journal.

HOUSE OF LORDS, 9*th August.*

The Marquis of Clanricarde rose, and said that he had one or two questions to ask of the noble and learned Lord on the woolsack, relative to a Bill which he and many other members of that House considered to be of very great importance to the vested rights of Patentees, as well as to the public at large. He wished to know if it was his Lordship's intention to proceed any further this session with the Bill to settle the practice and lessen the expense of obtaining Patents?

The LORD CHANCELLOR, in reply to the noble Marquis, admitted that this Bill was one of considerable importance: it had been considered so in the House of Commons, where it had undergone considerable examination, and had been frequently the subject of lengthened discussion; and he did not think that any measure of greater importance had been sent up this session from the other house; and as there was not a more delicate or difficult question of law than that of Patents, or one for which it was more difficult to legislate, so there was, in his opinion, scarcely any law that required revision and amendment more than this did; but then it required the utmost attention and considerable caution, not only as regarded the rights and interests of the Patentees, but also of the public, before any great changes could be made. He had approached the subject at first with great alacrity, because he felt that something ought to be done as soon as possible; but from the very great multiplicity of other business that had pressed upon his Majesty's ministers, he had no opportunity of going into this question with all that attention and care which he felt to be so very necessary. He had not even had an opportunity of going carefully into the report of the House of Commons on this subject, though the Committee who made that report was composed of members who possessed much practical experience: they had been occupied, as he believed, a considerable time in the investigation of the subject, and he supposed that it was upon their report that the Bill before their lordships was founded; but the ministers of the crown had not time seriously to consider the subject. Having admitted that some improvements in the law were undoubtedly requisite, he must at the same time say that there were other matters mixed up with those changes, and with the question generally, upon which he would not at present attempt to give any opinion; therefore, as he had not been able, from the excess

of other matter, to attend to this Bill in the way it required, he must now throw himself upon the indulgence of the House; and perhaps the suggestion he was about to submit, of postponing the Bill unto next session, because embracing as it did matter of great importance, though not professing to embody the whole of the alterations required, he hoped, for these reasons, their lordships would agree to the postponement. He regretted very much that it had not been in his power to go so far into the subject as to satisfy his scruples upon some points of the question, and he believed that some of their lordships had similar scruples upon this subject; but should their lordships postpone the further consideration of it until next session, he would assure the House that, as some compensation for this delay, he would devote a portion of his time as early as possible to that branch of the law with which it was particularly connected; besides this, if their lordships thought proper, before the Bill came up from the House of Commons next session, a committee of their lordships might be appointed to take the subject into consideration, and to examine those parts of the subject which had been left untouched by the other House of Parliament; and he would venture to say that he would be assisted in his labours by his noble and learned friend (Lord Lyndhurst), who was then absent; and his noble friend below him (Lord Wynford), he was sure would also pay his best attention to this important subject.

Lord Wynford remarked, that a more important subject did not exist, and most unquestionably it required considerably more attention and mature investigation than it was possible their lordships could bestow upon it at this very advanced period of the session.

Lord Plunket (Lord Chancellor for Ireland) acquiesced in what had been stated by the noble and learned lords who had just preceded him, as to the importance of the

subject, and the impossibility at present of entering into the nature of this measure so fully as the various interests which it embraced would require, and agreed with the noble and learned lord on the woolsack as to the propriety of postponing the Bill to another session.

Lord SHAFTESBURY then moved that the Bill be postponed until the next session, which was agreed to without a division.

ON THE PRACTICAL PREVENTION OF DRY ROT IN TIMBER.

THE following Lecture was delivered by Professor Faraday at the Royal Institution, February 22, 1833; and as the Specification of Mr. Kyan's Patent appears in the present Journal, a report of this Lecture will, no doubt, be acceptable to our readers, and is due to Mr. Kyan, as his process has been attended with such complete success.

Professor Faraday commenced by repeating a remark, that what was most elaborate in nature, was that which soonest runs to decay. It fell to his lot to bring before the members of the Royal Institution one of those instances of decay, in which nature seemed to have deprived mankind of the benefits she at first appeared disposed to promise, by shortening the duration of its enjoyment. But, in bringing forward the prevention of dry rot, he had no right to claim it as his subject, it being dependant on a process invented by Mr. Kyan, or, in stricter terms, improved by him; and he begged to say the meeting was indebted to the exertions and liberality of some of its members for the various illustrations before them.

With regard to decay in general, and to that of wood in particular, which gives rise to the destruction now to be guarded against, it was hardly possible to say any thing definite as to the cause of that decay, for it seemed to him that cause and effect

almost replaced each other; that is, what was a consequence at one time, was at other times a cause of the final ruin of those fibrous matters which are used for domestic purposes. On reference to the different specimens around him, instances would be seen of rapid and extensive decay, which it is the object of the process he had to bring before them to prevent. For instance (said Pr. F.), here is exhibited a beam of wood, in which the one part is rapidly passing to decay, and the other part is sound, or nearly so. There is a piece of wood on the table, made into a thin plank, and laid over the internal wood-work. It has been painted outside, and appeared to the eye to be good, but after a short time the rot caused it to decay; the rot had run from the interior to within the twentieth-part of an inch of the paint, which, aided by the air and light, had stopped its progress. Pr. Faraday showed another specimen, which had been sent to him by Professor Burnett, of the results of the same kind of decay, or what is called the dry rot fungus. It was the most magnificent he had ever seen, and was formed in a sort of gutter or wooden trough across a large room, the conservatory of his Grace the Duke of Norfolk. The fungus had prospered so much, that even its fructification was fully developed. Those who might wish to examine it closely, would see that the plant was extending itself from place to place, and producing here and there aggregations of seed-vessels consistent with its organic arrangements. Another specimen, was a case of decay from animal operations, which had been going on at Woolwich; it was taken from a large mass of timber, so penetrated by the worm, that it appeared to be like a piece of sponge. There was another piece similarly circumstanced, which had been a part of one of the timbers belonging to Brighton Pier. It in the first instance had been fifteen inches square, before being placed under water; and it was wonderful to observe how, by decay and the action of various insects, it had been brought to its present state. Another specimen was part of a mast of a vessel, which, though to appearance sound on the outside, was in the inside gone as if it had been hollowed out by a workman's tool; the decay had taken away the strength of the mast.

Wishing to obtain a clear notion of the subject, he, Professor Faraday, went a short time since to Woolwich, to ascertain what was proceeding under the sanction, or by order, of the Admiralty. He took an opportunity of going on board a frigate, the Thalia, to see the state of the timber that had been used in the construction of a vessel that was intended to hold hundreds of men. Reference might be made to one or two cases of decay on record with regard to such vessels, and the facts appear most extraordinary when we are led to consider what an enormous expense had been incurred from that cause. He understood (and all that knowledge which was not purely chemical he had obtained from others) that, in the construction of vessels in the navy, the proportion of wood consumed was about as follows :—A first-rate, carrying ninety guns or upwards, consumed in her construction 5,880 loads of timber; a second-rate, or eighty-gun ship, of which a model as regards the hull was on the table, consumed 4,339 loads; a third-rate, or seventy-gun ship, consumed 3,600; a fourth-rate, 2,372; a fifth-rate, 1,800; a sixth-rate, or twenty-eight-gun ship, 963 loads. Now, when they heard such statements as he would read from the *Quarterly Review* for 1813, it would give those who have not attended to the subject some idea of the importance of the present inquiry. The Rodney was launched in 1809; she had scarcely put to sea, when, owing to the unseasoned state of her timber, all her fastenings became loose, and it was necessary to bring her home from the Mediterranean in 1812, to be paid off. The next example was a very serious one; it was that of the Dublin. That ship was launched in February, 1812, put into commission in the following August, sent upon a cruise towards Madeira and the Western Islands in December, from which she returned to Plymouth, in 1813, in so dreadful a state, that she was ordered to be paid off. She has since been repaired at an expense not much less, it is stated, than £20,000. Cases could be mentioned of ships in private dockyards, which had scarcely been at sea before they were knocked up and sold as wood for fuel or other purposes, in consequence of the dry rot having taken possession of them; and it could even be shown that quantities of timber which had been stacked

up for seasoning, a process occupying from two or three to four or five years, had actually gone to decay while they were in seasoning, before they had been brought into use.

Circumstances like these have induced various persons to search for different remedies for the dry rot, and many processes have been devised: Government has from time to time been pestered, it may be said, by different inventors, who have failed to obtain the end in a desirable and perfect manner. Pr. Faraday said it was not his object to take into review those various processes; he had always considered that a process intended to be applied in a lagre way for useful purposes must be tried before an opinion was given on it. The importance of the subject was such, that Government have always paid that fair attention to such applications as would induce them to try the remedies proposed, if they came justified by sufficient evidence to deserve the tribute of praise, upon which the trials were called for. He might dispose of all these, because, having been tried fairly and having failed, it was presumed the trials had not led to any final application. He should take up only that one which he had considered (as far as its chemical principles were concerned, and as far as it was connected with the case), and thought *to be borne out by the previous knowledge of the substance used, as being sufficient for the purpose proposed; requiring only to be tried to justify the full assurance of its use.* The process he had to lay before them depended upon the application of an anti-destructive, which had been long known as a very active body in all such cases, namely, corrosive sublimate; for every anatomist and every visitor of an anatomical museum knows that corrosive sublimate was, and is, used from time to time to prevent the decay of the most delicate organic tissues and parts, even such things as the brain itself, which are liable to putrescence; and by the application of this metallic preparation, they can be prevented from going to decay, and be preserved for any length of time.

A gentleman of the name of Kyan, considering the property of corrosive sublimate, proposed to apply it to timber for the prevention of the dry rot: that is, cases of decay, whether they arise

from the action of the seeds of cryptogamous plants, vegetating in the wood, or from the presence of the albuminous parts of the tree. Mr. Kyan thought the evil might be stopped: that the commencement even might be prevented by the application of corrosive sublimate, in consequence of the chemical combination which takes place between the corrosive sublimate and those albuminous particles, which Berzelius and others of the highest authority, consider to exist in and form the essence of wood; which being the first parts that run to decay, cause others to decay with them. Mr. Kyan's conviction was such, that he went to the Admiralty to place it before them. They required certain trials to prove the soundness of the application, which trials he (Pr. F.) would now have to bring forward. After these were carried on for two or three years, the Admiralty advised Mr. Kyan to take out a patent; and were still engaged in watching the progress of these trials since that period.

He would now tell them how it was proposed to prepare timber, and what the results were. The proposition was to soak the timber itself in a solution of corrosive sublimate. Pr. F. then showed the model of what is termed a tank, in which the timber is to be immersed in the solution. He said that the meeting must not be struck with the name of that which a few years ago was rather expensive, bnt now a cheap application, for a pound of it did not cost *much in proportion to the good that would ensue, which he* (Pr. Faraday) *thought would be fully confirmed by the result after a few years' experience.* This being done, the timber is dried, and said to be prepared; it has been applied by Sir Robert Smirke to the new buildings in the Temple, and has been tested in a very extraordinary way, of which some account will now be given.

Besides the application of corrosive sublimate to timber, it has been applied to various fabrics not composed of wood, as, for instance, canvass, cottons, tows, and hemp, to prevent their decay. Before him were some of the pieces submitted to trial by order of the Admiralty, three years ago, in the fungus pit at Woolwich, which he (Pr. Faraday) went the other day to see opened. It was a pit dug in the yard, and enclosed by wood on all sides, having a double wooden cover; it was damp of itself, and into

this were put various kinds of wood of which they wished to make trial. One specimen was a piece of timber which came out at the end of three years as sound as it went in; but the unprepared timber had decayed up to the very joint. No part of it had been left. It had decayed and become rotten throughout, but the piece before them was left whole and sound, and fit for the construction of vessels. Last week he saw a large cube of wood which had been there first for three years; it was taken out, examined, and put in for two years more, altogether making five years. That cube of wood was again taken out and examined by him on Tuesday (the 19th February); it was hard and sound. *There was no sign of decay in that wood which had been submitted to the rotting action for five years,* nor of that destruction which seems to have come on so soon in the same pit with other pieces of wood.

Sir Robert Smirke had a couple of posts put up under a dropping eave, and both were exposed to the same actions. After a certain time one of them decayed; the other still stands, having been preserved by the power of this substance. There were before him some specimens of canvass and cotton which had been in various ways exposed to damp, placed in a cellar on the 10th December, 1832, and left till the 21st February, 1833: they were taken out for the purpose of being exhibited that evening. Another, a prepared and unprepared piece, which had been coiled up in a cellar from the 15th December, and left to the 21st February, 1833. The opposite effects seen were produced by the same circumstances of exposure on prepared and unprepared calico. One was as it went in, but the other was the calico corresponding to it, which had rotted and decayed. It was not possible to unfold, without destroying it, yet it had been similarly exposed as the first. Nothing could here deceive regarding the appearance of mildew; the difference between the two was so evident, that no person could make a mistake about them: one had run into decay, and was falling to pieces. Now he (Pr. Faraday) must confess, for his own part, that he was perfectly satisfied of the preservative effects of corrosive sublimate. He knew before hand that it would preserve things far more liable to

decay than timber, canvass, and cotton, but had had doubts as to its application. His query, in the first place, had been—was this preventive or anti-corruptive substance of such a nature that it could remain there, or was the effect not merely a temporary one, that would pass away after a time; and in the timber of vessels which were exposed to the bilgewater, and other water, where vessels were not coppered, was the sublimate not likely to be removed, and its effects destroyed; and, if that were not the case, was there not a fatal injury that might arise from the production of a noxious atmosphere? The answer was "No: we expect not; for chemical combination has taken place between the corrosive sublimate and the body to be preserved; and it prevents the destructive power going on, by combining and forming a new chemical compound with the albuminous matter of the wood." This being to him at that time a doubtful opinion, he wished to obtain some proofs for his own satifaction. And it was certainly true that the juices and sap of a plant were of such a nature that they would precipitate corrosive sublimate. He had before him, by way of illustration, a solution of corrosive sublimate, which would prove that the juices, or rather substances, remaining from the juices in the fibres of the plant, were easy of combination; and if a stem or branch of a tree were cut, the branch allowed to bleed, and the sap made to flow into a solution of the corrosive sublimate, combination did take place. Some of the solution used for the purpose were now exhibited; also various infusions of juices from plants. He took one of these and poured it into solution of corrosive sublimate; a combination was *instantly* effected, like the combination of vegetable substances with mineral bodies, producing similar effects, and altering the nature of the substance from that derived from the original source. It was also the nature of corrosive sublimate itself, that it entered, in this case, into a new combination, and that new properties were superinduced on the old ones. Therefore it was not to be expected, when they thus come together by a kind of chemical union, that the properties of the original substance should be free to act. No—part of the properties of the corrosive sublimate were subdued, and, in fact, the substance was not in that state in which it could be volatilized, or removed at ordinary temperatures.

Very simple proofs would be satisfactory. It occurred to him to take some of the prepared canvass, washing it thoroughly in water several times, to see if the sublimate could be removed from the cloth. Calico was taken in preference, because it seemed more easily to allow the removal of the new chemical combination, if that could be effected. He thought it would be the most conclusive proof to be obtained; for, if the properties of the compound would resist the application of water in calico, they would of course do so in timber, where the substance, combining with the sublimate, was contained in the pores of the sap-vessels. Not being satisfied with the work of others, he washed the prepared calico himself in water: he then showed a board on which he had put this washed calico; on one part was shown the portion of prepared calico which had been washed, and on the other a similar piece unprepared. The latter was covered with a coat of fungus nearly half an inch thick, the former was quite free from it. To be certain whether the calico so prepared and washed did retain any mercury, and to assure himself that it had not been accidentally so placed in the damp cellar that it was left uncorroded, while the unprepared piece was corroded, a portion was treated with dilute nitric acid, by which means he could, though to the injury of the whole material, separate the mercury. By washing the prepared calico in water, he was unable to obtain any portion of the metal, but the mercury *was* separated by nitric acid, showing that it had been in combination: and there was no reason, after such trials, to suppose it could be washed away, or rise as vapour, and be injurious. These two or three experiments influenced him in giving his judgment, that the process would be found effectual in preserving timber. He added, *I think the improvement so great as fully to justify its extensive application.*

A variety of official documents from His Majesty's Government, in proof of the efficacy of this process, have also been forwarded to us, which are perfectly satisfactory as to the praticability and success of the preparation.

Documents have also been received from high medical authority, that the process is in no way innoxious, or deleterious to the health of the parties employed therein, or in the after use of the timber.

List of Patents

Granted by the French Government from the 1*st of January to the* 31*st of March*, 1833.

PATENTS FOR FIFTEEN YEARS.

To Mr. Renault, lieutenant in the French navy, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patent Inventions, Rue-Choiseul, No. 4, for improved mechanisms to lower and raise the masts of steam vessels, whatever be the state of the sea.

—Penot, Achille, of Mulbausen, for a new motive power, called by him gazo-metallic.

—Daubrée, of Lavaur, for a new application of caoutchouc, cut in threads to the making of elastic tissues.

—Maitre, Joseph, of Villotte Sur Ource, for an improved flour mill.

— Baud, Claude, of Paris, for improvements in the making of glass bottles.

— Laporte, Jean Baptiste, for an engine called by him Hainsseline, or motive power.

— Arnollet, Pierre, for a new kind of waggon for rail-roads.

— Bonniot, Jean Baptiste, of La-Rochelle, for a conic wheel, to be used for dragging, and other purposes.

— Brame, Chevalier, of Lille, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, Rue-Choiseul, No. 4, for an improved apparatus for the evaporation of syrups, the crystallisation of salt, and applicable also to distillation.

PATENTS FOR TEN YEARS.

— Mr. Stewart, William, of London, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patent Inven-

tions, Rue-Choiseul, No. 4, for improvements in the mechanism or apparatus used for propelling boats.

To Ferrand and Marsay, of St. Etienne, for a new method of making charcoal with coal and artificial logs, with wood shavings, saw-dust, and other combustible matters.

— Descroisille, Paul, for a new and economical method of making pieces of masonry by moulding.

— Freidlein and Vigneaux, of Paris, for a new method of making flasks, vases, and bottles, of waterproof leather lined with tin.

— Lefaucheux, Casimir, of Paris, for a new fire-arm to be loaded at the breech.

— Huard, Panal, of Beaumont, for improvements in the weavers frame, by which the shuttle is driven without the help of the workman.

— Fusz, Pierre, of Paris, for an improved carriage.

— Jawtier, Louis François, for a method of ornamenting the skins usually employed in book-binding.

— Bomiche, Charles Joseph, of Paris, for an improved method of making plate glass.

— Gille, Jean Marie, of Paris, for a new calefier.

— Le Duc de Luynes, of Paris, for a new method of manufacturing Damascus iron.

— Delavaux, Réné, of Paris, for a new system of hydraulic wheels with moveable buckets.

— Kingston, William, of London, for an expeditious way of painting.

— Frealle, Felicien, of Tournay, for a fire-arm to be loaded at the breech.

— Martin, Jean Baptiste, of Lyons, for a mechanical process of dividing two pieces of velvet and plush made over one another, and joined together by the same stitch.

— De Beaujon, Ange Louis Dutemple, of Angers, for a circulating apparatus for refining sugar, and other purposes.

— Demouy Perint, François Charlemagne, of Orleans, for a method of making shoes and boots last longer.

— Wack, Henri Charles, of Strasbourg, for a mechanical plough.

To Monin, Joseph, of Vienne Jière, for a portable mill for grinding corn.

— Anderson and Read, of London, for an improved steam engine.

PATENTS FOR FIVE YEARS.

— Warne, Thomas, of London, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patent Inventions, Rue-Choiseul, No. 4, for certain improvements in gaiters.

— Bancel, Jean Pierre, of Saint Chammont, for improvements in silk tissues.

— Armonville, Jean Regnault, of Paris, for an economical cooking apparatus.

— Jandel, Adelaide, of Paris, for a new method of embroidering flowers.

— Bouvret, Louis, of Paris, for a new manner of enveloping cakes of scented soap.

— Duplomb, Clement, of Lyons, for the application of metal plates heated by steam to the dressing of woollen and other tissues.

— Cottiau, Alexandre, of Paris, for an improved powder-horn.

— Desvieux, Toussaint, of Marseilles, for a method of facilitating the ingress and egress of the port of Marseilles.

— Fertugière, brothers, near Perigueux, for improvements in the way of manufacturing the iron used for circling wheels.

— Martin, Ferdinand, of Paris, for a new machine for shearing cloth.

— Lépine, Claude, of Paris, for a machine called by him caloripède.

— Meynier, Alfred, of Lyons, for a machine called by him intersector, and employed in manufacturing striped velvets.

— Bernard, Jean Nicolas, of Paris, for a reciprocating sawing-mill, used to saw wood into any shape.

— Brewer, Henry, of London, for a pulp strainer, to be used in paper manufactories.

— Bontemps, George, of Choisy le Roi, for a new method of blowing glass into pieces of large dimensions.

To Peguchet and Bouillet, of Paris, for a new metal to be used in making thimbles.

— Geraud, Antoine, of Paris, for an improved lamp.

— Caiman, Duvergier, of Paris, for improvements in the way of manufacturing paper.

— Chaulmet, Pierre, for a new kind of bucket to be used in cases of fire.

— Moret and Co., of Moy, near St. Quentin, for a new method of manufacturing carpets with flax.

— Verzy, Jean Baptiste, of Paris, for a new kind of windmill.

— Farcot, of Paris, for a circular pump.

— Herpin, Jean Charles, for a process of extracting from wheat and other corn a greater quantity of flour than by the ordinary method.

— Sirhenry, Charles Louis, for a surgical instrument called lithotritor.

— Meyrand, Jean Baptiste, for a new kind of waterproof hat.

— Beisson, Joseph Honore, for a new kind of paper called hydrographic.

— Atock, of Versailles, for improved pessaries in caoutchouc.

— Rimbert and Co., of Paris, for an improved mechanical lamp:

— Gunz, François, of Paris, for an improved method of making candles.

— Lamory, Louis Jacques Frédéric, for an analeptic pectoral substance, called by him "kaïffa."

— Lespermont, brother and sister, of Fontenay, for an improved machine for making paper of large dimensions.

— Puget, junior, Louis Gabriel, for an improved apparatus for spinning four threads of silk at once, with only one wheel and one spinner.

— Puget, senior, Louis Gabriel, for applying the steam obtained in warming the water necessary for the spinning of silk, as a motive power to drive the machinery used in silk spinning.

— Mazurier, Jacques Victor Leon, of Rouen, for the application of a new vegetable substance to the stiffening, by means of heat, of the cotton warp.

To Pradel, Antoine, of Troyes, for improved double action bellows.

— Feray and Co., of Essoune, for a moveable recipient applicable to flour mills.

— Helfenberger, Denis Joseph Marie, of Bergerac, for a flour mill with two cylinders.

— Rousselet, Edme. Jacques, of Paris, for a mechanical apparatus for typographical printing.

— Leullier-Havard, Joseph, of Paris, for a new warming pan.

— Chatelain, Pierre Joseph, of Paris, for a new kind of clog, called by him Socque-agrafe.

— Brasseux, senior, of Paris, for an improved pocket seal.

— Martin and son, of Rouen, for a rotatory blowing machine.

— Guibert, Melchior Eleanor, of Paris, for a waterproof woollen tissue.

— Riviere and Braithwaite, of London, for an apparatus calculated to transmit power to various machines.

— Aubineaux, Louis Alexandre, of Strasbourg, for a new alarm watch.

PATENTS FOR ADDITIONS AND IMPROVEMENTS MADE BY THE PATENTEES.

— Merckel, Etienne George, of Paris, represented by Mr. Perpigna, of the French and Foreign Office for Patent Inventions, Rue-Choiseul, No. 4, for a third improvement on his patent fire-bottle.

— Mme. Mouroult, of Paris, for improvement on her patent waterproof soles for boots and shoes.

— Collier, John, of Paris, for improvements on his patent machine for carding wool and other substances.

— Laignel, Jean Baptiste, of Paris, for fifth improvement on his patent system of navigation on rivers.

— Dearne, Charles, of Paris, for improvement on his patent method of preserving wheat from the curculio.

— Lheulier, Jean, of Paris, for improvement on his patent stove for burning coal.

To Mme. Mouroult, of Paris, for second improvement on her patent waterproof soles for shoes and boots.

— Vacheron, Louis François, of St. Ouen, for additions to his improvements on Nalder's system of using caoutchouc for suspenders, garters, &c.

— Labourey, Jacques, of Marseilles, for improvement on his method of navigating without sails or steam, but with manual labour.

— Vernois, Benjamin Victor, of Paris, for a third improvement on his method of dividing expeditiously articles of small dimensions.

— Gauthier, Jacques Joseph, for improvement on his method of substituting heated, to cold air in the refining of iron.

— Gauthier, Delatouche, of Paris, second improvement on his elastic portable bedstead.

— Sanford, Henri, of Paris, for improvement on his machine for straining the pulp of paper.

— Repreu, Auguste Nicolas, for improvement on his panorama de Salon.

— Lheulier, Jean, of Paris, second improvement on his new stove for burning coal.

— Lefaucheux, Casimir, of Paris, for improvement on his patent fire-arm to be loaded at the breech.

— Millet, André, of Paris, for improvement on his patent fire grates.

— Vernois, Benjamin Victor, fourth improvement on his method of dividing expeditiously things of small dimensions.

— Merckel, Etienne George, of Paris, represented by Mr. Perpigna, of the French and Foreign Office for Patent Inventions, Rue-Choiseul, No. 4, for a fourth improvement on his patent fire-bottle.

New Patents

SEALED IN ENGLAND.

1833.

To John Petrie, of Rochdale, in the county of Lancaster, machinist and engineer, for his invention of certain improvements in steam engines.—Sealed 25th July—6 months for inrolment of specification.

To Joseph Pelletier, and Jean Adrien Desprez, of 11, Finsbury Circus, in the city of London, for their invention of improvements in making or manufacturing sulphate of quinine, being a communication from a foreigner residing abroad.—Sealed 25th July—6 months for inrolment.

To John Kitchen, of the town and county of the town of Newcastle-upon-Tyne, printer, for his invention of certain improvements in printing presses.—Sealed 25th July—6 months for inrolment.

To William Rodger, of Norfolk-street, Strand, in the county of Middlesex, for his invention of a certain improvement or improvements in anchors.—Sealed 26th July—6 months for inrolment.

To David Rees, of Brecon, South Wales, woollen manufacturer, for his invention of improvements on drags, or apparatus to be applied to carriages.—Sealed 7th August—6 months for inrolment.

To Robert Smith, of the Abersychan iron works, in the parish of Trevithin, in the county of Monmouth, gentleman, and John Walkinshaw, of the same place, engineer, for their invention of an improved rail for rail-ways.—Sealed 10th August—6 months for inrolment.

To William Wigston, of the gas works, Salford, near Manchester, in the county of Lancaster, engineer, for certain improvements in apparatus for consuming smoke, which improvements are applicable to the furnaces of steam-boilers, and to furnaces constructed for other purposes.—Sealed 12th August—6 months for inrolment.

To Joshua Bates, of Bishopsgate-street, in the city of London, merchant, for certain improvements in machinery or apparatus for cleaning and combing wool, or such other fibrous substances, being a communication from a foreigner residing abroad.—Sealed 13th August—6 months for inrolment.

To John Dyer, of Trowbridge, in the county of Wilts, engineer, for his invention of a machine for fulling, thickening, felting, and cleansing woollen cloth, or any other fabric requiring the process of fulling, thickening, felting, or cleansing, in the course and process of the manufacture thereof.—Sealed 13th August—6 months for inrolment.

To Francis Stiles Blake, of his Majesty's Dock-yard, Portsmouth, shipwright, for his invention of an improvement in fids for the upper masts, running-bowsprits, and jib-booms of ships and other vessels.—Sealed 14th August—6 months for inrolment.

To John Scott Russell, of No. 8, Stafford-street, in the city of Edinburgh, in North Britain, M.A., for certain improvements in the construction of vessels for sustaining the pressure of fluids, and in the boilers and machinery of steam engines, and in the manner of their application to locomotive purposes.—Sealed 14th August—6 months for inrolment.

To John Read, of Regent-street, in the county of Middlesex, merchant, for certain improvements in machinery or apparatus for raising or forcing fluids.—Sealed 19th August—6 months for inrolment.

To William King Westley, of Salford, near Manchester, in the county palatine of Lancaster, flax-spinner, and Samuel Lawson, of Leeds, in the county of York, machine-maker, for their invention of certain improvements in machinery or apparatus for preparing, drawing, or roving hemp, flax, wool, and other fibrous substances. —Sealed 20th August—6 months for inrolment.

To Sir Charles Webb Dance, of Hertsbourne, Manor-place, in the county of Hertford, knight, lieutenant-colonel, and Joshua Field, of Lambeth, in the county of Surrey, engineer, for their invention or improvements in the boiler and other apparatus for locomotive carriages.—Sealed 20th August—6 months for inrolment.

To William Henry Barnard, of No. 26, New Bond-street, in the city of London, gentleman, for his invention of a solvent not hitherto used in the arts.—Sealed 20th August—6 months for inrolment.

CELESTIAL PHENOMENA, for September, 1833.

D. H. M.

1 0 0 ☿ stationary
— Clock after the Sun 0 m. 9 s.
— Moon rises 5 h. 13 m. sets 6 h. 45 m.
— Moon rises 8h. 2m. P.M. sets 7h. 5m. A.M.
— Moon passes the meridian 14h. 1 m.

2 0 0 Mer. R. A. 9 h. 43 m. dec. 11. 51. N.
— Ven. R. A. 7 h. 53 m. dec. 19. 43. N.
— Mars R. A. 11 h. 55 m. dec. 1. 21. N.
— Jup. R. A. 2 h. 15 m. dec. 12. 2. N.
— Sat. R. A. 11 h. 58 m. dec. 2. 34 N.
— Georg. R. A. 21 h. 30 m. dec. 15. 35. S.
— Vesta R. A. 18 h 38. m. dec. 26. 28. S.
— Juno R. A. 15 h. 9 m. dec. 5. 43 S.
— Pallas R. A. 6 h. 52 m. dec. 6. 51. S.
— Ceres R. A. 8 h. 18 m. dec 23. 38. N.
12 0 ♂ in conj. with ♄ long. 28. in Virgo. ♂ lat. 43. N. ♄ lat. 2. 6. N. diff. of lat. 1. 23.

2 14 31 Jupiter's first sat. will im.

3 16 22 ☽ in conj. with ♃ long. 3 in Aries ☽ lat. 4. 42. S. ♃ lat. 1. 26 S. diff. of lat. 3. 16.

4 15 52 Jupiter's second sat. will im.

5 0 0 Clock after the ☉ 1 m. 26 s.
— ☉ rises 5 h. 20 m. sets 6h. 36 m.
☽ rises 9 h. 21 m. P. M. sets 11 h. 37 m. A. M.
— ☽ passes the meridian 17h.

7 5 55 ☽ in □ or last quarter.

8 0 0 ☿ elong. max. W. 17. 57.

9 16 25 Jupiter's first sat. will immerge.

10 0 0 Clock after the Sun 3 m. 7 s.
— ☉ rises 5h. 28 m. sets 6h. 25 m.
— ☽ rises 0 h. 21 m. A. M., sets 4 h. 56 m. P. M.
— ☽ passes the meridian 21 h. 46 m.
12 56 ☽ in conj. with ♀ long. 6. in Cancer. ☽ lat. 2. 2. N. ♀ lat. 34. S. dif of lat. 2. 36.

11 10 54 Jupiter's first sat. will im.

11 11 0 ☿ in Perihelio.

12 5 45 ☽ in conj. with ☿ long 1. in Leo. ☽ lat. 3. 42. N. ☿ lat 1. 5. N. diff. of lat. 2. 37.

D. H. M.

23 0 ☽ in Perige.

13 10 17 Ecliptic conj. or ● new moon.

14 0 42 ☽ in conj. with Sat. long. 29. in Leo. ☽ lat. 4. 55. N. Sat. lat. 2. 6. N. diff. of lat. 2. 49.
8 34 ☽ in conj. with ♂ long 2. in Virgo. ☽ lat. 4. 59. N. ♂ lat. 0. 37 N. diff of lat 4. 22.

15 0 0 Clock after the sun 4 m. 51s.
— ☉ rises 5 h. 36 m. sets 6 h. 13 m.
— ☽ rises 7 h. 17 m. A. M. sets 7 h. 23 m. P. M.
— ☽ passes the meridian 1h. 33m.

18 0 0 Mer. R. A. 13 h. 56 m. dec. 8. 43. N.
— Venus R. A. 9 h. 13 m. dec. 16. 2. N.
— Mars R. A. 12 h. 35 m. dec. 3. 10. N.
— Jupiter R. A. 2 h. 12 m. dec. 11. 41. N.
— Saturn R. A. 12 h. 5 m. dec. 1. 44. N.
— Georg. R. A. 28 h. 28 m. dec. 15. 48. S.
— Vesta R. A. 18 h. 51 m. dec. 26. 38. S.
— Juno R. A. 15 h. 24 m. dec. 7. 15. S.
— Pallas R. A. 7 h. 21 m. dec. 9. 29. S.
— Ceres R. A. 8 h. 41 m. dec. 22. 45. N.
12 48 Jupiter's first sat. will im.

20 7 45 ☽ in □ or first quarter.

22 10 24 Jupiter's second sat. will im.

22 19 21 ☉ enters Libra.

24 3 0 ☽ in conj. with Sat. long. 18. in Capri. ☽ lat. 2. 39. S. Sat. lat. 2. 6. N. diff. of lat. 4. 45.

25 0 0 Clock after the ☉ 8 m. 2 s.
— Sun rises 5 h. 52 m. sets 5 h. 50 m.
— ☽ rises 5 h. 11 m. P. M. sets 1 h. 36 m. A.M.
☽ passes the meridian 10 h. 1 m.
14 42 Jupiter's first sat. will im.
18 0 ☽ in Apogee.

27 9 11 Jupiter's first sat. will imm.

28 11 26 Ecliptic oppos. or ○ full moon.

29 2 0 ☿ in conj. with Sat. long. 2. in Libra. ☿ lat. 1. 36. N. ♄ lat. 2. 6. N. diff. of lat 0 30.

30 18 58 ☽ in conj. with ♃ long 2. in Aries. ☽ lat. 4. 40 S. Jup. lat. 1. 30. S. diff. of lat. 3. 10.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR JULY AND AUGUST 1833.

1833.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.	1833.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
July.						Aug.					
26	80	42	30,23	Staty.		11	70	38	29,97	29,94	,05
27	82	49	30,22	30,19		12	66	36	29,80	29,68	
28	79	50	30,23	30,20		13	65	35	29,67	29,65	
29	74	49	30,23	30,19		14	66	41	29,69	29,63	
30	76	44	30,32	30,26		15	65	38	29,78	29,72	
31	67	39	30,33	30,28		16	65	37	29,84	29,81	
Aug.											
1	68	42	30,26	Staty.		17	67	36	29,87	29,86	
2	70	40	30,23	30,19		18	63	39	29,79	29,67	
3	69	39	30,24	30,18		19	66	38	29,82	29,71	,225
4	67	39	30,28	30,17		20	65	37	29,89	Staty.	
5	69	39	30,06	Staty.		21	73	49	29,84	29,80	
6	67	41	30,08	30,07		22	65	40	29,86	29,70	
7	67	36	30,05	Staty.		23	67	39	29,91	29,85	
8	68	39	30,02	30,00		24	64	37	30,09	30,01	
9	71	38	29,98	29,97		25	65	37	30,24	30,15	,025
10	69	39	29,96	29,93							

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES,

AND

REPERTORY

OF

PATENT INVENTIONS.

No. XVIII.

CONJOINED SERIES.

Recent Patents.

To John Thompson, *late of the London Iron and Steel Works, Parade, Thames Bank, near Chelsea, in the county of Middlesex, but now of Newhall-street, Birmingham, in the county of Warwick, Esq., for his invention of improvements in the steam engine.*—[Sealed 28th February, 1833.]

These improvements in the steam engine apply, in the first place, to that construction of steam engine which is commonly called a semi-rotatory or reciprocating rotatory engine, that is, in which the pistons vibrate or reciprocate within annular or ring-formed chambers.

In my improved engines I employ two pistons in each

annular chamber or cylinder, the steam being admitted into the chamber alternately on opposite sides of the pistons, for the purpose of exerting its expansive force between them and stationary steam stops.

The pistons are attached to the outer rims of the chambers or cylinder, which are movable, and the steam stops are fixed on the stationary drum, consequently the pistons and cylinder reciprocate on the drum, and from thence is communicated the moving power of the engine; or the steam stops may be fixed in the outer casing or rim of the circular chamber, and the pistons be attached to the inner rim or drum, the moving power of the engine being then communicated from the shaft of the drum.

In the second place, my improvements in the steam engine consist in a new or improved construction of air pump and condenser, applicable to all steam engines which work upon the condensing or vacuum principle, the piston of the air pump being constructed to rotate or reciprocate in an annular or ring-formed chamber; all of which improvements are shown in the accompanying drawings.

In Plate VI., fig. 1, is a section taken through the cylinder of one of my improved steam engines, with the working pistons attached to the outer rim of the cylinder or ring-formed chamber, one of the sides of the chamber being removed in order to show the interior; but there are some of the outside working parts drawn in this figure for the purpose of showing the connexion of the slide valves.

The cylinder or ring-formed annular chamber is represented at A, A, with its pistons B, B, connected to the outer rim C, C; consequently, it will be perceived that they rotate or reciprocate together upon the stationary drum D, D, and communicate the driving power from the engine. E, E, are the two steam stops extending across the cylinder, and having metallic or other packing to prevent

the escape of the steam; there are also metallic or other packings placed at the junctions of the sides of the cylinder and the drum, which are let into the cylinder in order to prevent the escape of the steam. The steam boxes F, F, are shown with pipes leading from the boiler or generator to supply the engine; *a, a,* are the channels or ways formed in the solid part of the drum, which act alternately as induction and eduction passages for the steam into and out of the cylinder; *b, b,* are the slide valves, with their rods passed through stuffing boxes, and worked by cranks or bent levers *c, c,* having their fulcrums on the outside of the drum, and connected together by a rod *d.*

The slide valves are worked by a connecting rod and excentric placed upon the crank shaft of the engine, as will be described under figs. 2 and 3: *e,* is a pipe for the escape of the steam from the engine. When the slide valves are in the position shown in the first figure, steam will be allowed to enter the cylinder by the passages *a* 1, *a* 1; and, by exerting its expansive force between the pistons and steam stops, will cause the pistons and cylinder to turn in the direction of the arrows, and bring them into the position shown by dots—that is, near to the steam stops, when the valves will be changed, and the induction of the steam from the boxes by the passages *a* 1, *a* 1, cut off; at the same time the passages *a* 2, *a* 2, will be open for the free progress of the steam into the cylinder, when the pistons will be forced the reverse way, thereby producing a reciprocating or simi-rotatory motion, which may be communicated from the engine by a crank and connecting rod, or in any other convenient manner for the driving of other machinery, the waste steam at the same time being allowed to escape by the passages *a* 1, *a* 1, into the pipe *e,* and from thence to the atmosphere or condenser; and on the pistons arriving at the end of their stroke, the steam will be cut off from the passages *a* 2, *a* 2, which will then become

eduction passages, and the steam will again be admitted through the passages *a* 1, *a* 1.

As the movements of this kind of engine will be readily understood, it will not be necessary for me further to describe its minutiæ, it being evident that a continuous rotatory motion may be obtained from this semi-rotatory or reciprocating movement in many ways, either by employing a crank shaft and connecting rod, or by using two or more cylinders and pistons.

Fig. 2, is a side elevation of one of my improved engines complete, consisting of two cylinders; fig. 3, is a front end elevation of the same, some of the parts being removed to prevent confusion; *a*, is the cylinder; *b*, the drum fixed on to the frame work; *c*, is the steam pipe leading from the boiler, connected by branches to the steam boxes *d*, *d*; *e*, is the pipe for the escape of the steam to the atmosphere or condenser; *f*, is the connecting rod from the engine to the crank *g*, the shaft of which turns upon bearings in the frame work, and carries a fly wheel on its end; *h*, is an excentric, placed upon the crank shaft which works the slide valves in the manner before described, by means of the rod *i*, connected to their bent levers *k*, *k*.

Fig. 4, is a section through one of my steam engines, with the pistons attached to the drum, which rotates upon its axis; the steam stops being fixed upon the outer rim of the cylinder, or stationary annular ring-formed chamber, secured by its frame work and supports to the floor of the engine room. A, A, is the cylinder; B, B, the pistons; C, C, the drum; D, D, the outer rim of the cylinder with the steam stops E, E, fixed to it. Steam is conducted by pipes to the chambers or boxes F, from whence it passes alternately through the passages *a*, *a*, into the cylinder; and when it has exhausted its expansive force in the engine, it is allowed to escape through those passages to the atmosphere or condenser by the pipe *b*, in the manner

before described; *c, c,* are the slide valves, worked by bent levers *d, d,* and rods, or in any other manner; *f,* is the crank, to be connected by the rod *g,* to the fly wheel shaft.

Having now described the construction of my improved steam engines, it only remains for me to remark, that in order the cylinders may be equipoised, and kept steady in their motion upon the drums, there should be arms connected to the cylinders, which have bosses revolving upon a stationary shaft; and that when two or more cylinders are used, the steam may be worked expansively—that is, the induction passages may be closed before the pistons have arrived at the end of their stroke; or it may be used at a certain pressure in one cylinder, and then passed into a second of larger dimensions; and lastly, that by using two cylinders with the pistons in opposite positions, all inertia in passing the centres of the cranks will be overcome.

Fig. 5, is a section taken through my improved air pump and condenser, which consists of an annular or ring-formed chamber, divided into two portions by stops or partitions extending across the chamber, one portion forming the condenser, the other the air pump, in which there is a piston working with a reciprocating or semi-rotary alternating motion, similar to the pistons of the steam engine above described. A, is the portion of the annular chamber which constitutes the condenser; B, the air pump. The steam is conducted from its exit passages in the engine into the condenser by the pipe *a,* where it meets with a jet of cold water, thrown into the condenser from the pipe *b.* The condensed steam and water is drawn through the clack or foot valve in the partition *c,* by the piston or bucket *d,* of the air pump as it ascends; and when the piston has arrived at the end of its stroke, the foot valve at *c,* closes, and the one in the piston *d,* opens, allowing the condensed steam, air, and water, to escape through that valve as the piston descends; and on the next

up stroke of the piston, the condensed steam, air, and water, will be forced through the passage and valve in the partition *f*, and escape by the waste water pipe *g*. The pistons of the pump are connected to the drum *h*, which is actuated by a crank *i*, and rod *j*, leading from the engine, or it may be worked in any other convenient manner. The partitions *c*, and *f*, are fixed upon the outer rim *k*, of the annular chamber, and there is an elastic packing placed between their ends and the periphery of the drum, for the purpose of forming an air-tight joint.—[*Inrolled in the Rolls Chapel Office, August,* 1833.]

Specification drawn by Messrs. Newton & Berry.

To CHARLES WATT, *of Clapham, in the county of Surrey, surgeon, for his invention of a new or improved method or process of preparing tallow and stuff from fatty materials, and refining the same for the manufacture of candles and other purposes.*—[Sealed 27th September, 1832.]

THIS invention consists in subjecting the rough fat, tallow, stuff, or other fatty materials, to a process of boiling, with water containing a weak solution of caustic alkali, simple or compounded with ammonia: small quantities of alkaline solution being occasionally added during such boiling, and great care being taken to avoid saponification; and after the tallow has been liberated from the animal substances, containing gellatin, albumen, fibrin, and colouring matter, it is allowed to settle, and is then submitted to the action of boiling water containing a weak solution of acids, and is kept boiling by a gentle heat (steam being preferred)

until the scum on the top of the tallow subsides; and after settling a few minutes, the tallow is again boiled in water, to wash out the acid.

In order that my process of preparing tallow may be better understood, I shall more minutely detail it, stating such proportions and quantities of water, alkalies, and acids, used to prepare and refine a given quantity of rough material, as I find best to answer the purpose; but I hereby declare that I do not intend to confine myself to the precise quantities and proportions herein stated, as it may be necessary to make some slight variation to suit the different kinds and qualities of the raw material; but I declare that the quantities and proportions herein stated are best suited to the average and ordinary kinds and qualities of the raw material.

Having put into the vat or melting vessel a quantity of water, in the proportion of about fifteen gallons to each hundred stone (of eight pounds per stone) of rough material to be prepared and refined, the water is brought to the boiling point by the aid of steam admitted into the vat in any convenient way, or by the aid of any other means of imparting heat, steam heat being preferred, as it is not so likely to injure the body, texture, or colour of the tallow, as the direct action of fire. I then introduce into the water in the vat or melting vessel a solution of alkali, as potash, soda, &c., I prefer it to be caustic; or in lieu of such solution, I introduce into the water in the vat or melting vessel a quantity of such alkaline earth or earths, as lime, &c., as will answer the purpose, the solution containing about one pound and a half of alkali to the one hundred stone of fatty materials intended to be prepared or refined.

The rough fat having been previously chopped into small lumps, is then let down into the vat or melting vessel,

and the whole is made to boil; and during the time it is in a state of ebullition, I add, occasionally, about as much more alkaline solution as will contain about a pound of alkali at each time; and this is to be added at proper intervals, namely—about every fifteen or twenty minutes. This process is to be kept up until the whole of the gellatin, albumen, fibrin, and other animal matter, is detached, and until the lumps or dabs of fatty materials disappear, and the whole of the tallow rises to the surface of the water, taking great care that no saponification takes place during this process of boiling with the alkaline solution; but should this happen, more chopped fat, or fatty material, is to be added, until the tallow separates, which will be evinced by its rising again to the surface. The whole quantity of alkali required in this process to reduce and prepare a ton of fatty materials not being more than about six or seven pounds. Sometimes, and more particularly when the rough fatty materials are stale, I add about one pound of sub-carbonate of ammonia, or a pint of pure liquid ammonia, to the ton of fat during this process of boiling.

After the rough materials are reduced to a state of melted tallow, that is, when the tallow is liberated from the gellatin, albumen, fibrin, or other gross materials, it is left to settle a short time, that is, until it becomes clear, and is then removed to the refining vat or vessel, which should be formed of wood, or such other materials as acids, simple or compound, do not act upon. Into the refining vessel I previously introduce sufficient water to cover the bottom of it, to the depth of about two or three inches, and then add some diluted acid, and boil the whole, by steam or otherwise, until all the scum on the tallow subsides. The diluted acid which I use to each ton of tallow, is about three pounds of sulphuric acid diluted with three gallons of water.

In the event of there being more rough materials to be melted or prepared, the water and alkali (which, from being the heavier, will be found at the bottom of the vessel under the detached animal matter) are to be pumped or drawn off, leaving in the melting vat or vessel the solid parts, lest they should contain some dabs or lumps of fat, or should, from their being thick, retain some melted tallow among them. Fresh water in quantities as at first, and alkaline solution, or alkaline earth, as before mentioned, is then to be added, and the process to be regulated precisely as before; when the whole quantity is completed, then the under water is to be again pumped or drawn off, and if any dabs or lumps remain, fresh water is to be added to them, and alkaline solution in half the quantity to that employed upon the fresh fat: regulating that quantity according to the amount of dabs or lumps remaining.

The solid or gross parts left, after all the tallow is reduced and liberated therefrom, may be dried by a gentle heat, and pressed into greaves, or used for any other purpose for which animal matter is adapted.

The scum being boiled down, the second part of my improved process is a good criterion that the tallow is in a fit state to settle. When the tallow has been boiled with the diluted acids in the second part of this process, and has sufficiently subsided, it is conveyed to another vessel, where it is submitted to the action of boiling water for a few minutes, which will wash the tallow free from any acid that may be mixed up with it. The water in this vessel is also boiled by steam; and if the ebullition should not be sufficient, it may be kept stirred up during the time it is boiling; and when the tallow has sufficiently settled after this third boiling, it is drawn off into the coolers, and when properly reduced in temperature, may be packed off in the usual manner.

I prefer the use of steam heat to boil the materials in my improved process, as it is not so likely to injure the body, colour, or texture of the tallow.—[*Inrolled in the Rolls Chapel Office, March,* 1833.]

Specification drawn by Messrs. Newton & Berry.

To WILLIAM MASON, *of Margaret-street, Cavendish-square, in the county of Middlesex, patent axletree maker, for his having invented certain improvements in the construction of wheeled carriages.*—[Sealed 10th August, 1831.]

THIS invention will be understood by reference to the several figures applying thereto in Plate VII., of which fig. 1, is a plan showing the fore-axletree bed *a, a,* of a four wheeled carriage, to which the axletrees *b, b,* are jointed at each end in the following manner:—

Fig. 2, is an enlarged plan; and fig. 3, an elevation or side view of one end of the said fore-axletree bed, having a Collinge's axletree jointed to the axletree bed by means of the cylindrical pin or bolt *c,* which passes through and turns in a cylindrical hole *d,* formed at the end of the axletree bed, shown also in the plan view fig. 4, and section fig. 5.

The axletree *b,* is firmly united with the upper end *e,* of the pin or bolt *c,* and to the lower end of it, which is squared, the guide piece *f,* is also fitted, and secured by the screw *g,* and cap or nut *h,* seen in fig. 3, and in section in fig. 6.

There are leather washers *i, i,* let into recesses made to

receive them in the parts *a*, *b*, and *f*, the intent of which is to prevent the oil from escaping that is introduced through the central perpendicular hole seen in fig. 6, which hole is closed by means of a screw inserted into it.

The oil is diffused or spread over the surface of the cylinder *c*, by means of a side branch leading from the bottom of the hole into a grove formed around the cylinder, and also by means of two longitudinal gaps or cavities made within the hole, as shown in figs. 4 and 5.

The guide piece *f*, is affixed at right angles with the axletree *b*, as shown in fig. 2, and turns freely and steadily in the cylindrical hole *d*, made to receive it in one end of the iron fore-axletree bed *a*. In like manner the opposite fore-axletree *b*, fig. 1, is jointed to the other end of the iron fore-axletree bed.

The outer ends of the guide pieces *f*, *f*, are jointed to the splinter bar *n*, fig. 5, as follows :—Fig. 7, is a plan, and fig. 8, a section of the joint *o*, in fig. 1, shown on an enlarged scale ; a cylindrical pin or bolt *c*, is firmly affixed in the splinter bar, and around the lower part of the said pin or bolt ; the guide piece *f*, turns, and is secured in its place by the screw *g*, and screwed nut *h*.

Oil is conveyed to the lower part of the cylindrical pin *c*, in a similar manner to that already described, and two leather washers are likewise furnished to prevent its escape. The connecting joint at the opposite end of the splinter bar *n*, is constructed in a similar manner. The futchel or socket *p*, *p*, for the pole of the carriage, must also be jointed to the middle of the fore-axletree bed and splinter bar in a similar manner. The swingletrees *q*, *q*, fig. 1, are likewise jointed in the same way to the splinter bar. Fig. 9, is a side view of these parts.

The fore-wheels of the carriage, fig. 1, are furnished with cast-iron boxes, as usual. The dotted lines show the action

of the pole *p*, *p*, upon the splinter bar *n*, and as communicated through the latter to the guide pieces *f*, *f*, connected with the axletrees *b*, *b*, so as to lock the wheels *r*, *r*, as shown in that figure.

The axletree bed may be encased in the wood work of the fore-bed of the carriage, as usual, and as shown by dotted lines in the back end view thereof, fig. 10; and the framing *s*, fig. 11, may be affixed firmly upon the said wood work in any fit and proper manner, as well as the fore-springs *t*, *t*, shown in figs. 10 and 11, and likewise in the side view, fig. 12.

In certain cases it may be desirable to fix the cylindrical pin or bolt *c*, firmly in the splinter bar *n*, in the manner shown in figs. 13 and 14, the single trees *q*, *q*, and guide pieces *f*, *f*, turning freely above and below upon the said pin or bolt, and secured in their places thereon by screws and screwed nuts, oil being also supplied through holes formed in both ends of the said pin or bolt, and leather washers provided, as in the above described instances.

Having thus shown and described various methods of carrying my said invention into effect, I hereby declare that I do not mean or intend to limit myself to the employment of Collinge's axletrees only, but to use any which may be best adapted to the particular kind of carriages they are to be used with. I recommend that all due care be taken in the accurate manufacture and fitting together of the various parts composing the different joints; and I prefer to make the cylinders, and the parts containing the cylindrical holes, of wrought-iron, case-hardened, and afterwards properly ground together and polished. I do not intend hereby to limit or confine myself to the application of my said improvements to any particular kinds of four wheeled carriages, but to apply them, with proper modifications, which may readily be

made by coachmakers, to all descriptions of four-wheeled carriages whatever.—[*Inrolled in the Inrolment Office, February*, 1832.]

Specification drawn by the Patentee.

To Joseph Marie Ursule La Regandelle Du Buisson, *of Fenchurch-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for a new method of extracting, for the purpose of dyeing, the colour from dyewoods, and other substances used by dyers.*—[Sealed 12th February, 1830.]

This invention consists in obtaining the colouring extract from dye woods and other materials, by saturating the material in steam, instead of boiling it in water or other liquors. For the accomplishment of this object, an apparatus is provided of the kind shown in section in Plate VII., at fig. 15.

A vertical box *a, a,* is constructed, into which is put the chips of wood or other materials from which the colouring matter is to be obtained. The box is to be lined with glazed tiles or glass, to prevent any chemical materials from acting upon it. There is a lid at top shutting down steam tight, and a false bottom *b*, perforated like a colander, for the extract to drain through. Below the false bottom is the real bottom of the box *e*, placed on an inclination, to assist the drainage; and a pipe *d*, for leading it off into a shallow evaporating vessel *e*.

The evaporating vessel *e*, is fixed in a trough *f, f,* which is intended to be filled with steam: the trough

must be lined with sheet lead, and made perfectly tight at all its joints: *g*, is a pipe by which steam is conducted from a boiler into the trough, where it acts upon the bottom of the pan or vessel *e*, and heats the liquor therein for the purpose of promoting evaporation.

From the trough *f*, the steam passes through another pipe *h*, into the box wherein the chips of wood or other materials are deposited, and the steam, by filling the vessel saturates the materials therein, and causes the colour to pass off with the condensed liquor: which, gradually draining to the bottom of the box, passes through the colander or false bottom, and along the inclined plain *c*, and is discharged by the small pipe *d*, into the pan or shallow vessel, where it becomes thickened by evaporation.

In making an extract of the colouring matter from woods or drugs which are soluble in water, the steam of water is employed; but where the materials are resinous, the vapour of spirits of wine is to be substituted.—[*Inrolled in Inrolment Office, April*, 1830.]

To JOSEPH COCHAUX, *of Fenchurch-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of an apparatus calculated to prevent, or render less frequent, the explosion of boilers in generating steam.*—[Sealed 24th April, 1830.]

THE subject of this patent is a means of opening the safety valve of a steam boiler, for the purpose of allowing a portion of the steam to escape when the internal pressure becomes so great as to endanger explosion.

The construction of the boiler is not proposed to be varied from those on the common plans; it is to have a small pipe issuing from the upper part of its waggon-shaped top, which pipe is to be bent downwards, as shown in Plate VIII., at fig. 16, and to contain mercury in the lower part *a, a, a,* up to the level of the dotted line. A float *b,* is then to be introduced at the upper open end of the pipe, with a cord passed over a pulley *c,* and counter weight *d.*

The safety valve *e,* on the top of the boiler, has a long rod or lever *f,* connected to it, which rod is suspended on a fulcrum *g.* The rod has a balance weight *h,* on its shorter arm, and a plate or disc *i,* at the end of its longer arm.

The pressure of the steam within the boiler acting upon the mercury in the tube *a, a,* forces it up the perpendicular part of the tube, and lifts the float also; consequently, the counter weight *d,* descends, and when the pressure has become too great, it falls upon the disc *i,* at the end of the lever, and by that means the safety valve is opened, and the steam allowed to escape.—[*Inrolled in the Inrolment Office, October,* 1830.]

To Thomas Robinson Williams, *of Nelson-square, Blackfriars-road, in the county of Surrey, Esq. for his invention of improvements in power looms, applicable to weaving yarn and other materials.*—[Sealed 6th February, 1830.]

In the construction of a loom which is to be worked by a continuous uniform rotatory power, various appendages are necessary to produce those distinct parts of the movements

of the loom at proper intervals, which are usually performed by the hands, regulated by the discretion of the workman. To effect these movements by a more simple mechanism than has been hitherto employed, is the object of the present patent.

Plate VIII., fig. 17, represents a longitudinal section of a loom on the improved plan; *a, a, a,* are the side standards, and frame work, *b, b,* are the treadles or harness; *c,* is the roller on which the work, when woven, is wound; *d,* may be called the warp roller, but the work is, in this instance, supplied to the loom by a series of bobbins *e, e, e,* mounted in a creal or open frame.

The threads which are to constitute the warp being drawn severally from the bobbins *e,* are passed round the roller *d,* for the purpose of giving them tension: they may also be passed round the other roller *f,* which is held by a weighted friction cord, in order to increase the tension.

The warp threads are carried forward from the rollers *d,* and *f,* through the treadles or harness *b,* and through the reed and slay *g,* and being there woven, the work passes over the breast roller *h.* From the breast roller the work hangs down in its full width, and is kept tight by a weighted roller *i,* from whence it passes over what may be called a second breast roller *k,* down to the work roll *c,* which it is then wound upon.

The movements of the machine are derived from the crank shaft *l,* upon the axle of which is a drum or rigger, driven by a band from a steam engine or other power. This crank shaft, as it goes round, gives the vibratory motion to the slay *g,* by means of a rod *m,* which connects the two together.

On the axle of the crank shaft there is also a toothed wheel *n,* taking into another toothed wheel of twice its diameter, which last mentioned wheel carries two cams *o, o,*

intended to act upon the treadles *p*, *p*, that work the harness.

By the rotation of the wheel, the cams *o*, *o*, alternately press down one of the treadles, the harness or treadle connected to it being by the same means brought down also; the other treadle and harness rises at the same time, and the sheds of the warps open. The descent of the treadle likewise gives the vibratory movement to the pecker lever *q*, for the purpose of projecting the shuttle along the race or box of the slay *g*; and a click *r*, extending from the slay, acts upon a ratchet wheel fixed on the axle of the work roller, which at every vibration of the slay drives the wheel one tooth forward, and hence causes the work to be progressively wound on the roller *c*.

In order that the tension of the warp may be always equal, and never subjected to any relaxation, from the roller *d* delivering too freely or strain from the roller *c* taking up too fast, the work is made to hang in a loop, the weighted roller *i*, distending it, and preserving a certain tension; the roller being drawn up when the strain upon the warp becomes too great, or let down when the work becomes too lax.

The general construction of the loom having been described, the Patentee states, that he does not claim to have invented the several parts of the loom, but the arrangement of the whole as a machine capable of weaving by rotatory power; and he particularly claims the mode of giving tension to the warp threads, by drawing them off bobbins from a creal, and passing them round a roller in the way shown; and also the mode of preserving the uniformity of tension by the pendant roller placed in a loop of the work.—[*Inrolled in the Inrolment Office, August*, 1830.]

To Henry Gore, *of Manchester, machine maker, for an improvement in the machine called by spinners throstle frames, and spinning frames, which machines operate by spindles and flyers, and bobbin, for spinning or twisting yarn or threads.*—[Sealed 22d December, 1831.]

"These improvements relates to those parts of spinning machines which are called the collars, for the upper bearings of the spindles, which retain the spindles in vertical positions as they revolve, and consist in substituting for the ordinary collar a hollow tube, which is fixed fast at its lower end into the spindle rail, in the same manner as the ordinary collar would be fixed therein; but the tube stands up in a vertical position above the spindle rail, and the interior of the tube is a larger bore than the size of the spindle which passes through it, except at the upper end, which rises up into the hollow within the barrel part of the wooden bobbin, and the bore of the tube at that upper end fits the spindle correctly, so as to form the upper bearing for the spindle, and to retain it in its vertical position when it revolves.

"The collar or upper bearing for the spindle is situated at the upper end of a fixed tube, which rises within the hollow of the wooden bobbin, instead of the collar or upper bearing being wholly below the base of the wooden bobbin, as the same has been heretofore situated; and the upper bearing being raised higher towards the top of the spindle than usual (for a spindle which is to carry the same sized bobbin), the spindle will be more securely retained in its vertical position, and will be less liable than usual to lateral vibration when it is turned with great rapidity; and also as there is, according to my said improvement, less length of

the spindle, and consequently less weight of moving parts above the collar or upper bearing than usual; so there requires less length of the spindle than usual below that upper bearing, whereby the whole length of the spindle may be considerably lessened without impairing the steadiness of its motion, because there is the usual preponderance of weight below the upper bearing, in proportion to the weight and stress above that bearing, such as is found by experience to be a necessary preponderance to preserve a spindle steady, and without lateral vibration, when it is urged by a very rapid motion; and the spindle, according to my said improvement, being shorter, may be made more slender, and therefore may be made considerably lighter than usual, without being liable to that unsteadiness of motion which is the objection to short and slender light spindles, when the same are mounted on the common plan of an upper bearing entirely beneath the base of the wood bobbin.

"The wooden bobbins for spindles which are mounted according to my improvement with a fixed tube, in order to raise the upper bearing within the bobbin, must be made with a larger hole in the lower bush than usual, because that lower bush is to fit upon the fixed tube instead of fitting upon the bare spindle; but the upper bush of the wood bobbin is fitted to the bare spindle as usual.

"Now, by the lower bush of the bobbin revolving about the fixed tube, which constitutes my improvement, it will have more friction to overcome than usual, and consequently the drag of the bobbin, and tendency to gather the thread around the bobbin, will be greater than by the ordinary plan, wherein the bobbin is fitted upon the bare spindle. That increase of drag will be found advantageous for twisting two or more strong yarns together into thread; but in other cases, and for spinning finer sorts of the yarn

where such increased drag of the bobbin would be objectionable, a thin tube may be fixed on the spindle, by screwing it fast thereon just at that part where the spindle comes out through the collar or bearing at the top of the fixed tube.

"The tube, which is fixed to the spindle, must extend downwards, and surround the outside of the fixed tube, but without touching it; and upon the surrounding tube which revolves with the spindle, the lower bush of the wooden bobbin is fitted, the upper bush of the bobbin being fitted on the the bare spindle as usual.

"In this way the drag of the bobbin will be less than common, because the said revolving tube being of a larger size than the bare spindle, will cause more friction; and as that friction tends to carry the bobbin round, it will diminish the drag or resistance which the bobbin opposes to turning round when dragged by the thread; whereas, without the revolving tube, the lower bush of the bobbin being fitted upon the fixed tube and revolving thereon, the friction will tend to increase the drag of the bobbin.

"In plate VII., two spindles are represented, mounted according to my improvement, and each one is shown in section. In fig. 18, *a*, is the upper end of the spindle, and *b*, the lower end or toe, which runs in the step or cup, supported by the lower spindle-rail; *c*, is the wharve or whirl, whereby the spindle is turned round; *d*, is the flyer screwed on the top of the spindle; and *e*, the wooden bobbin; *f*, is the tubular collar, constructed according to my said improvement; the lower part *g*, of the collar is fitted into a hole in the upper spindle-rail, and is fastened therein by a nut, which is screwed on beneath, and which draws it fast down to the shoulder; the tube *f*, rises upon the spindle, as shown in the section.

"The bore of the tube *f*, is as much larger than the spindle as to allow it to turn round freely; but a brass bush is

driven tight into the tube, near the upper end thereof, which fits the spindle exactly, and forms the collar or upper bearing for the spindle.

"The upper bush of the wooden bobbin *e*, is fitted upon the upper part of the spindle just as usual; but the lower bush is bored out larger than usual, to fit the outside of the fixed tube *f*. There is a metal washer *h*, fitted loosely upon the outside of the tube *f*, so as to slide freely up and down thereon. The flat flange of the metal washer rests upon the flat surface of the copping rail, and the usual circular washer of woollen cloth is interposed between the base of the wood bobbin and the top surface of the flange of the washer.

"The metal washer *h*, is left quite at liberty either to go round with the bobbin or to stand still; and another cloth washer may be placed beneath it on the copping rail if required. The tube *f*, around which the bobbin runs, being immovable, the friction which takes place between the lower bush of the wood bobbin and the outside of the tube, tends to augment the drag of the bobbin.

"The upper side of the flange, at the bottom of the tubular collar, is hollowed out to form a cup for the reception of oil, and every time the washer descends on the tube, it dips into the oil, and carries up with it as much oil as will keep the outside of the tube *f*, sufficiently greased, in order to make the lower bush of the bobbin run light upon the outside of the tube.

"The same tube may be fixed in the copping-rail; it will then move up and down the spindle from two or three inches or to the length of the lift, which enables the spindle to wear much longer and make it convenient for oiling; and when the bobbin is up at the top of the spindle, the top of the tube is nearly there also, which keeps it steady.

"The copping-rail is made a proper strength, and is fitted up in the best manner.

"Fig. 19, represents a similar spindle, with the addition of a thin metal tube *j*, *j*, which is fastened on the spindle just above where it comes through the top of the tubular collar, by screwing in the same manner as a flyer is screwed on, and this tube covers over and surrounds the outside of the tubular collar *f*, but without touching that outside or any other fixed part; but the tube *j*, turns round with the spindle, and the lower bush of the bobbin is fitted to the outside of the tube, the use of which is to diminish the friction and drag of the bobbin, because the tube on which the lower bush of the bobbin is fitted, turns round in the same direction as the bobbin is required to turn.

"Having now described the nature of my said improvement, I hereby declare that what I claim as my invention, is the mode hereinbefore described of constructing the collars of spindles of machines, commonly called by spinners, "throstle frames, and spinning frames," for spinning or twisting yarn or thread, whereby the upper bearings of such spindles are raised up within the hollow of the wooden bobbin, as in the manner, and for the purposes hereinbefore stated."—[*Inrolled in the Inrolment Office, June*, 1832.]

Specification drawn by the Patentee.

To Frederick Smith, *of Dunstan's Hall, Chesterfield, in the county of Derby, Esq., for his invention of certain improvements in preparing or finishing piece goods made from wool, silk, or other fibrous materials.* [Sealed 12th February, 1830.]

The object of this patent is an attempt to press woollen and other cloths upon the roll, instead of the ordinary mode

of pressing between flat plates. The principles on which the Patentee proposes to effect his object are perfectly absurd. He states, that his invention consists in "the application of the effect of centrifugal force acted upon by a counteracting pressure when applied to the finishing of piece goods made from wool, silk, &c." In other words, the cloth is to be tightly wound upon a cylindrical roller, and the roller, with the cloth, is then to be put in rapid rotation upon its axis, by which means it is considered that the cloth will acquire "centrifugal force," that is, a tendency to fly off in all directions from the periphery of the roller; and this force being counteracted by the gravity of a weighted sheet suspended over and bearing upon the roll, it is considered that a pressure of the substance of the cloth between the sheet and the roller will be the immediate consequence.

It is scarcely necessary to observe, that this theory is formed upon a true principle in philosophy, but impracticably applied. Great geniuses sometimes take extraordinary flights; but, with submission to the Patentee, we beg to suggest, that the same principles which retain the planets in their orbits, and preserve their spherical figures, are not equally subservient to the finishing of piece goods.

The apparatus by which this object is proposed to be effected is shown in Plate VII., at fig. 20; *a*, is the roller, with a length of cloth wound round it. The roller is suspended by its axle in a box or close chamber *b*, *b*; and beneath the roll is a horizontal pipe *c*, perforated with holes, which being supplied from a boiler at a distance, emits a series of jets of steam immediately against the surface of the cloth within the close box. The sheet of any suitable material, extends in breadth over the whole length of the roll of cloth, and is fastened at one end to a fixed bar *e*, and at the reverse end has a weighted rod *f*,

appended, which keeps the sheet tightly pressed upon the upper surface of the rolled cloth. The roll being now put in rapid rotation, the outer surface of the cloth is pressed, or rather rubbed by the weighted sheet, which bears upon its periphery, and it is the supposed centrifugal force of the cloth as it goes round, resisted by the surface of the weighted sheet, which is intended to produce the pressing effect contemplated.

In order to wind the cloth very closely upon the roll, it is passed between several tension bars shown at *g*, on the side of the box; and as the cloth is drawn through between the tension bars, the resistance which it is subjected to causes it to be drawn tightly upon the surface of the roll.

When woollen cloth is submitted to this process, it is recommended that a long sheet of *Russian drill* be placed upon the face of the cloth, and wound upon the roll with it, for the purpose of producing a smooth surface or finish. [*Inrolled in the Inrolment Office, August,* 1830.]

To Moses Poole, *of Lincoln's-inn, gentleman, in consequence of a communication made to him by a foreigner residing abroad, for a certain combination of, or improvement in, springs, applicable to carriages and other purposes.*—[Sealed 27th February, 1830.]

The springs here proposed are formed by straight bars of steel, which are to be placed horizontally, with one of their edges raised at an angle of about forty-five degrees. In this inclined position each bar is secured by a bearing and clamp, which holds it in the middle, and on the face of the bar, near to each end, an arm or bracket is firmly attached, from which the carriage is to be suspended.

In Plate VII., fig. 21, shows one of the steel bars *a, a,* secured in the inclined position described to the stationary block and clamp *b*; the arms or brackets *c, c,* are fastened to the box near its extremities, and when the weight of the carriage is pendent from those arms or brackets, the bar will have a tendency to bend or be drawn from its inclined position into a flat one.

Four of these bars, placed at right angles to each other, may be connected together by chains from the extremities of the brackets; and the blocks *b,* of the two opposite bars being fixed to the frame of the carriage, and the blocks of the transverse bars to the body of the vehicle, an elastic support will be obtained, suited to bearing the body of a stanhope or other two-wheeled carriage.

It is obvious that the invention consists solely in the peculiar manner of holding the bar and straining its ends, so as to obtain a spring, and not in any particular combinations of these bars; the invention, therefore, is claimed as a carriage spring, in whatever way it may be advantageously applied. It is also in the contemplation of the Patentee to adapt the same sort of springs to beds, seats, and couches; but no precise mode of applying them to those purposes is shown in the Specification.—[*Inrolled in the Inrolment Office, April,* 1830.]

To JOHN SAMUEL DAWES, *of Bradford Works, West Bromwich, in the county of Stafford, iron master, for certain improvements in the manufacture of iron.*— [Sealed 29th January, 1833.]

THE Patentee describes his improvement in the following words:—" My invention consists in producing malleable

iron from iron slag, or cinders, or other oxides of iron, by mixing with such oxides, coal, charcoal, or other matters having a greater affinity for oxygen than iron has; and submitting the same to heat in a reverberating or other furnace, until decomposition takes place."

Such is the Specification, without further details, and upon which we deem it unnecessary to make any comment. [*Inrolled in the Inrolment Office, July,* 1833.]

To Richard Trevithick, *of Cambourne, in the county of Cornwall, engineer, for his invention of an improvement or improvements on the steam engine, and in the application of steam power to navigation and to locomotion.*—[Sealed 22d September, 1832.]

"These improvements on the steam engine consist in interposing between the boiler and the working cylinder, in a situation to be strongly heated, a long pipe, formed of a compact series of curved or bent pipes, which I denominate the dry pipes, or steam expanding apparatus; through which dry pipes I cause the steam, after it has been generated in the boiler, in contact, and consequently saturated with water, to pass with very great velocity, in order that it may imbibe a copious supply of additional heat without any addition of water, and by this additional heat to be expanded into a greater bulk of steam, of about the same expansive force that it had acquired in the boiler; by which means I obtain a greater volume of steam for use in the working cylinder than the boiler alone could supply.

"And in order still further to augment this volume of steam, I place the working cylinder within a case, consti-

tuting a part of the flue or chimney, that the cylinder may be kept considerably hotter than the steam employed in it, by absorbing a great portion of the heat remaining in the flue after having heated the boiler and the dry pipes, which heat would otherwise pass away out of the top of the chimney and be wasted; but by this arrangement is converted into a useful power, by further expanding the steam in the cylinder.

"And I do further declare, that in carrying this part of my said improvement into effect, I do not find it necessary to confine myself to any particular form of boiler or arrangement of pipes in which the steam is to be heated; but by preference, as being very compact in form and economical of fuel in using; I make my boiler of a number of upright pipes standing upon and communicating with a tubular ring placed around and a little below the fire-grate.

"These pipes all surround the fire-place, except two or three, the lower ends of which are elevated above the fire-door, but connected at the bottom by a branch pipe, united to one of the adjoining upright pipes, thereby leaving an opening or place of access to the fire.

"The pipes all extend upwards to the height of several feet, according to the quantity of steam required to be raised, combined with local convenience; for it is obvious that the power of this boiler to raise steam may be increased, either by an increase in the length of the pipes, or of their diameters, or of their numbers.

"Upon the upper ends of the pipes described, and connected with them, I lay a tubular ring, similar to that upon which the pipes stand, the two rings and the upright pipes forming together a vessel in which water has free communication, by means of the bottom ring, to stand at the same level in all the pipes, and the steam has free communication to pass from all the pipes into the upper ring: and, for

the sake of obtaining great heat, I place my system of dry pipes over the fire and within the circular row of upright pipes of the boiler, hereinbefore described; and I form my dry pipes in pairs, each pair constituting the figure that is well understood by the term inverted syphon; and I unite several of these syphons together by short bent pipes at the top, so as to constitute one long zig-zag pipe, through which the steam must successively pass down and up the alternate legs of each syphon with great velocity, which is necessary for the rapid absorption of heat in its passage from the boiler to the working cylinder of the engine, the working cock valves or slide of which being united by a pipe of communication with that leg which is last in the succession of syphons.

"I unite the first in succession of these inverted syphons with the upper tubular ring of the boiler by means of a bent pipe, in which a throttle valve or cock is placed in order to limit the supply of steam, that it may have space in the dry pipes and working cylinder to expand in proportion as it receives additional heat; and I fix a safety valve in communication with the boiler, and another in communication with the dry pipes; and I place around outside the boiler, at a small distance from the upright pipes, two cylindrical casings, one within the other, and fill up the space between the two casings with sand, ashes, or other material which conducts heat but slowly; and I close up the upper end of the casings over the boiler and the dry pipes with a covering in the form of a dome; and out of this inclosure I make the flue to pass to and around the working cylinder of the engine, whence the flue carries the smoke and little remaining heat away in any convenient manner.

"And I make my boiler pipes, rings, and casings, by preference, of iron or copper, and my dry pipes of copper or other strong metal, not liable to rapid oxydation by heat

when in contact with steam; and I supply my boiler with water by means of a forcing pump, so adjusted as to keep the water at the proper height.

"And I do hereby further declare, that the nature of my said invention, as regards the improvements in the application of steam power to navigation, consists in the drawing of water into a receptacle placed near within the stern of the navigable vessel, which water is drawn in, through an orifice in the stern, with a moderate degree of velocity, in the direction of the course of the vessel, and ejected with great force and speed in a direction opposite to the course of the vessel, through the same orifice, reduced to about the quarter of the area, by means of a valve opening as the water enters, and partially shutting as the water is ejected; and thus I propel the vessel with great force, derived from the recoil of the water set into rapid motion, in a direction opposite to the course of the vessel, the rapidity of the jet of water to be at least equal to double the required speed of the vessel to be navigated.

"And I further declare that, by preference, I effect the purpose of receiving and ejecting the water, and of deriving a motive force from its recoil, by means of a large vertical cylinder, of cast iron or other metal, closed at both ends, in which a piston is forced up and down, by a piston rod sliding through a stuffing box in the lid, which piston rod receives its motive force from a steam engine.

"And I fix a tube into the after side of this cylinder, near the bottom, in communication with the space below the piston, which tube leads through the stern of the vessel as low down as practicable, and opens on one side of the rudder; and I fix another tube into the after side of this cylinder near the top, in communication with the space above the piston, which tube also leads through the stern of the vessel as low down as practicable, but opens out on the

other side of the rudder; and I place in the mouth of each of these tubes a valve, opening inwards, to allow the water free entrance, equal to the bore of the tube, and partially shutting when the water is ejected, so as to reduce the opening through the stern to about one-fourth of the area of the tube.

"And I do hereby further declare, that the nature of my said invention as regards the improvement in the application of steam power to locomotion, consists in the application of such a boiler, together with the expanding apparatus as aforesaid, to locomotive engines, whereby a diminished weight of boiler and quantity of water, and fuel is obtained.

"Plate VIII., fig. 1, represents a vertical section through the various essential parts of the boiler; the dry pipes, the steam pipe, the working cylinder, the propelling cylinder, and the flue, together with other minor parts, serving to show the connexions of the essential ones. This section is taken through the centre of the machine, shown in plan view at fig. 2, where the top coverings of the boiler and working cylinder are removed.

"Fig. 3, exhibits the manner of uniting the shorter upright pipes over the fire-doorway with one of the adjoining ones, so as to give free circulation of the water in all the pipes.

"Fig. 4, represents three pair of syphons, which in their places stand in circular form, but in this figure are shown as spread out into a plane. In order the better to explain their structure and joinings, similar small letters and numbers of reference are used to denote similar parts in all the figures; *a*, the upright boiler pipes, the upper and lower ends of which are contracted, to leave room for bolt heads and nuts, without throwing the pipes too far asunder; *b*, the tubular ring, having a flanch projecting inwards and

outwards at the upper side, perforated with apertures, upon which the upright pipes are bolted, and another flanch at the bottom, projecting inwards, to bolt the ring down to the foundation plate; *c*, the foundation plate; *d*, the fire grate; *e*, the fire-doorway; *f*, the upper tubular ring, having a flanch at the bottom, projecting inwards and outwards, and perforated with apertures, corresponding with the tops of the upright pipes, upon which the tubular ring lies, and to all which it is bolted; *g*, the level of the water in the boiler pipes; *h*, *h*, the dry pipes, formed like inverted syphons, so as to require no joining at the lower part near the fire.

"One leg of each of the two syphons shown in fig. 1, is in section, and broken near the bottom; an outside view of the other leg appears partly behind the section. The short bent pipes *k*, at top, are each bolted to two syphons, to unite them into one continuous pipe. The bent pipe *l*, unites the upper tubular ring with the first in succession of the syphons.

"The proper situation for this pipe is that shown in fig. 2; but for the sake of clearness and simplicity in the drawing, it is represented in fig. 1, as if on the left hand pipe and syphon; *m*, is the throttle cock, on the bent pipe *l*; *n*, the safety valve, lever, and weight, on the same; *p*, the pipe of communication from the last in the succession of syphons to the working cylinder of the engine; *r*, the throttle cock in the pipe *p*; *s*, a four-way cock, worked by the hand gear, to direct the steam alternately under and over the piston; *t*, the safety valve in communication with the dry pipes; *u*, the two cylindrical casings surrounding the boiler pipes, the space between the two being filled up with a slow conducting medium; *v*, the dome covering over the cylindrical enclosure; *w*, the flue leading out of the enclosure into the casing of the working cylinder; *x*, the casing

of the working cylinder, forming a continuation of the flue; *y*, the farther continuation of the flue to the chimney; *z*, the waste steam pipe leading into the chimney.

"The steam pipe 1, leads from the working cock into the top and bottom of the working cylinder; 2, is the working cylinder; 3, the piston with metallic packing; 4, the piston rod, passing down through a stuffing box at the bottom of the working cylinder, and also continuing downwards to form the rod of the propelling piston; 5, the propelling cylinder; 6, the water or propelling piston; 7, the upper aperture leading to one of the tubes opening through the stern of the navigable vessel; 8, the lower aperture, leading to the other tube, opening also through the stern of the navigable vessel; these apertures are made as wide as the cylinder will allow, in order that they may have but little depth, and not occasion an inconvenient length of the propelling cylinder; a frame 9, supports the steam cylinder upon the propelling cylinder; the feed pump 10, is for supplying the boiler with water; 11, an arm fastened on the piston rod, to work the feed pump and hand gear; 12, is the hand gear."

The Specification concludes by saying, Now "I claim as my invention, firstly, the interposing between the boiler and the working cylinder of the steam engine a long many-curved heated pipe, through which the steam is forced to pass with great rapidity, without being permitted to come in direct contact with water, by which arrangement steam is made to absorb additional heat, and at the same time allowed to expand itself into a greater volume.' Secondly, placing the working cylinder of the engine within such part of the flue or chimney as shall insure the cylinder being kept hotter than the steam used in it, by which means the expanding of the steam is still further promoted. Thirdly, propelling a navigable vessel by the force of the recoil produced from

water received with a moderate degree of velocity into a receptacle near, within the stern, in the direction of the course of the vessel, and ejected with great velocity in a direction opposite to that course, the velocity of the jet being at least double the required speed of the vessel to be propelled; provided always, that the same be effected in the manner hereinbefore described. Fourthly, applying a boiler combined with a steam expanding apparatus, as before described, instead of a boiler alone to a locomotive engine, whereby the power of the steam is applied after the steam has undergone the expanding process, and whereby a diminution is effected in the weight of the boiler, and in the weight and consumption of water and of fuel.—[*Inrolled in the Inrolment Office, March,* 1833.]

To JOHN OBADIAH NEWELL RUTTER, *of Lymington, in the county of Southampton, wine merchant, for his invention of an improved process for generating heat applicable to the heating of boilers and retorts, and to other purposes for which heat is required.*—[Sealed 30th March, 1833.]

THE subject of this patent is the employment of bituminous, resinous, or oily matters in connection with water as a combustible material, which, it is said, will produce a fuel for furnaces, boilers, &c., capable of giving out a very intense heat. Strange as the suggestion of applying water as a combustible material may appear, it is reported to have been found extremely advantageous, economical, and convenient. We, of our own knowledge, can say nothing upon the subject, but merely give the Patentee's views and re

commendations in reference to the manner in which he proposes to employ those materials for the production of heat.

Bituminous, oleaginous, resinous, waxey, or fatty substances are to be employed: as coal tar, which is to be combined with water in certain proportions. It is proposed that a stream of coal tar shall be allowed to flow from a reservoir through a pipe with a stop cock, and likewise a stream of water from another reservoir through a similar pipe; that the two streams shall meet, and fall into one general receiver with a funnel tube, by which they may be together delivered into the furnace.

The proportions are recommended to be one gallon of coal tar to one gallon and a half of water, the flow of the two liquors to be regulated by suitable apertures or stop cocks. These quantities of materials are to be slowly discharged from the funnels that the whole shall occupy from two to three hours in its delivery into the furnace; and where the furnace is of such magnitude as to require it, several of these funnel tubes may be employed, each delivering its supply of materials in the proportions and times stated.

It is not necessary to use water in a pure state, to be mixed with the coal tar, as foul water will answer the purpose equally well; and on shipboard, where the invention may be usefully applied to steam navigation, the bilge water from below, or sea water, may be pumped up and employed for the purpose, and on land the ammoniacal liquor from gas works will also suit as well as fresh water. —[*Inrolled in the Inrolment Office, September,* 1833.]

To William Howard, *of Rotherhithe, in the county of Surrey, iron manufacturer, being one of the people called Quakers, for his having invented certain improvements in the construction of wheels for carriages.* —[Sealed 27th February, 1830.]

The particular object of this invention is to fix the ends of the spokes or radial arms of wheels to the felloe or rim with greater security than has been effected by any of the old modes. The nave of the wheel and the spokes are to be of wood, as usual; but the felloe or rim of the wheel is proposed to be of wrought-iron, and the blocks or shoes by which the spokes are to be affixed to the rim, are to be of cast-iron, bolted and rivetted to the rim.

Plate VII, fig. 22, shows a portion of a wheel constructed according to the proposition of the Patentee; *a*, is the nave of wood; *b*, *b*, *b*, wooden spokes inserted into the nave in the usual way; *c*, *c*, *c*, is the rim or felloe intended to be formed by one entire circle of wrought-iron; *d*, and *e*, *e*, are the shoes or blocks of cast-iron for receiving the ends of the spokes, which are secured by bolts to the rim on the inner circumference.

The cap of the block *d*, is removed for the purpose of showing the internal form of the block; *e*, *e*, have their caps fixed on as they would appear when the spokes are fitted in.

One of the caps or shoes is shown detached upon a larger scale at fig. 23, by which it will be perceived that the end of the spoke is introduced into the shoe on the side. It is proposed that the end of the spoke shall not reach quite to the end of the recess formed in the block, and that it shall be made tight by a wedge driven in.

The wedge piece is to be of wood, as fig. 24, with a small slip of iron within it, and a hole is perforated in the back of the block or shoe for the wedge to be driven through. When this is done, the ends of the spokes become confined and tight; and the projecting extremities of the wedges being cut off, the caps are then attached on the face of the block, as at *e*, *e*, by pins riveted at their ends, which secures the spokes and renders it impossible for them to be loosened by the vibrations as the wheel passes over the ground.

The outer surface or periphery of the wheel is to be protected by a tire, which may be put on in pieces as ordinary tires, and bolted through the felloe, or it may be made in one ring, and be attached when hot, allowing the iron to shrink and become tightly fixed.

One important use of the wedges is to correct the circular figure of the wheel, which may be readily forced out in any part that may be out of the true form by driving the wedge up further; and this, it is considered, will be a very important advantage, as the nearer a wheel can be brought to a true circle, the easier it will run upon the road.—[*Inrolled in the Inrolment Office, August*, 1830.]

To George Scott, *of Water-lane, in the city of London, engineer, for his having invented certain improvements on, or additions to, windlasses, and relative machinery applicable to naval purposes.*—[Sealed 20th March, 1830.]

The object of this invention is to afford a small degree of elasticity to a ship's cable. This has been heretofore effected by various contrivances called elastic stoppers, one

of which is frequently attached to a slack part of the cable near the end that is made fast to the ship, for the purpose of allowing the cable to give out on any sudden strain taking place from the pitching of the vessel. In the present instance the elasticity is afforded to the cable from the windlass by mounting the barrel of the windlass upon a vibrating carriage supported upon springs.

Plate VIII., fig. 5, is a side view of the improved windlass, shown partly in section; *a, a,* represents a flat plate bolted to the deck of the vessel, to which the end pieces *b,* that carry the barrel of the windlass *c,* are attached by joints, or by an axle *d,* passed through eyes or lugs in the bottom plate. The two end pieces *b,* are connected together by a cross brace, and they are kept in their erect position by powerful springs *e,* placed beneath the bevelled edges of the end pieces.

The cable *f, f,* passes from the barrel of the windlass through a cylindrical tube *g,* wich tube is connected to the end pieces *b,* of the windlass by chains *h,* attached at one extremity to the cylinder, and at the other to ears on the edges of the end pieces.

The rotation of the barrel of the windlass causes the cable to be wound on and drawn up through the cylindrical tube *g,* in which there is a pendant tooth that drops down, or other contrivance for stopping the cable whenever it has a tendency to run back by any strain while winding upon the barrel. To prevent, however, any sudden jerk from the recoil of the cable when so stopped, the windlass itself is enabled to give way; and consequently when the strain upon the cable is sufficient to depress the springs, the windlass falls back by turning upon its axle, and affords the required relief. The springs may be of the form shown, or helical, or any other kind of springs may be employed in the same situation.

As a further relief to the cable, the cylindrical tube *g*, which contains the stopper, may be made with a helical spring within connected to the stopper, by means of which a greater extent of elastic action will be given to the cable than could be afforded by the giving way of the windlass alone.

The Patentee does not claim any of the parts of the apparatus as new in themselves, but claims the arrangement of the whole as an improvement in the construction of the windlass.—[*Inrolled in the Inrolment Office, September*, 1830.]

To Thomas Wells Ingram, *of Birmingham, in the county of Warwick, die sinker, for his invention of an improved method of manufacturing a certain description of button by the application of machinery not used before for that purpose.*—[Sealed 15th August, 1832.]

We do not perceive in this Specification any improvement proposed in the method of manufacturing the particular kind of buttons alluded to, nor, indeed, any mode whatever of manufacturing buttons. The invention is simply a press intended to be applied to the pressing of horn discs for buttons after the discs have been cut into the desired shapes and sizes. The only novelty suggested by the Patentee appears to be that of employing a press of a certain construction for pressing horn buttons, presses of the like kind never having been used before for that purpose.

Plate VIII., fig. 6, represents a section of the press, with its standards or frame, which is proposed to be driven

by steam power through the medium of a band and rigger on the shaft *a*, from whence a train of toothed gear drives the shaft of the rotatory cam *b*. There are two levers *c, c*, jointed to a roller *d*, the lower one bearing in the bed of the press *e*, and the upper one supporting a movable table *f*. When the cam *b*, as it revolves, brings its larger radius to bear against the roller *d*, the levers *c, c*, are forced into perpendicular positions, by which means the table *f*, is raised up, and the buttons or discs of horn being placed upon that table in suitable dies, are, by the resistance of the top bar *g*, pressed into the desired figure. The lever *h*, is to be employed for forcing the levers *c, c*, back again into the inclined position shown in the figure.

Several of these presses may be mounted in one frame of a suitable width; and, in that case, the operation of pressing discs may be carried on with great rapidity —[*Inrolled in the Inrolment Office, February,* 1833.]

REPORT
ON THE
PRESENT STATE OF BLACKFRIARS BRIDGE,
AND THE BED OF THE
RIVER THAMES IN ITS VICINITY.

To the Worshipful the Chairman and Committee for directing the Repairs of Blackfriars Bridge.

Report of Messrs. Stephenson and Blunt, civil engineers, on the present state of Blackfriars Bridge, and on the proposed alterations and repairs required to secure it: considered with regard to the condition of the superstructure, and the further dilapidation to be anticipated of the superior portions of the foundations which have already suffered.

Gentlemen,

The consideration of the condition and of the repairs required to place this important structure out of danger, has obliged us to follow our observations and examinations with detailed plans and estimates, as these examinations were respectively executed. The difficulty also of obtaining assistance from any existing documents relating either to the progress or completion of this work, has retarded the earlier delivery of our plans.

In laying before your Worshipful Committee the result of our examinations and inquiries, we shall present to you the various points to which they refer, in the order in which we made them, and our observations and practical deductions which such inquiries induced us to adopt, both as being the most practicable and complete, and at the same time the least speculative and expensive.

The anxiety with which, in an inquiry of this nature, we must look to the perfect condition and stability of the piling and of the foundations, influences us in the organization of our survey and report, and on this we have made a careful and systematic examination of the piers.

Before, however, entering into the detail and the extent of the repairs required, it was indispensable to carefully ascertain and determine the original and present character of the bed of the river, under, and in the immediate neighbourhood of the foundation; and to determine, as accurately as might be within the reach of practicability, how far any alteration in the bed either had already, or was likely hereafter, to affect the safety or stability of the whole structure; and whether, since the date of the foundation of the bridge, any deterioration had, up to the present time, actually taken place or not.

We have considered it prudent to address a particular attention to the bed of the river, from the great anxiety

which has prevailed respecting the effects expected to arise from the removal of Old London Bridge, in the additional scour which such removal was anticipated to produce through the other bridges of the river.

In the instance of the Blackfriars Bridge, our opinion (founded on the practice afforded by similar works, and careful observance) is, that no serious consequences are likely to arise to its foundations from the increased water-way effected by the removal of Old London Bridge.

We form this opinion firmly and on general grounds, which will, we trust, be subscribed to by every practical man; for we consider it would be most unfair to the high and unquestionable reputation of the engineer who had the honour of originating and executing this bridge, to conclude that the removal of the Old London Bridge positively has already, or will produce, any injurious effects on the Blackfriars Bridge, which its architect did not clearly foresee, and in his arrangement of the foundations sufficiciently provide against.

To indulge in hypothesis without waiting for the support of circumstantial proof of its soundness, or to provide for an exigence before we arrived at a distinct prospect of its probable approach, should, in a practical consideration, which is to involve a great outlay of money, be avoided, and a patient inquiry be instituted into the actual injury already arrived, and its utmost probable extent, with a view to a temperate treatment equal to the case, but not needlessly expensive.

The fear of impending evil, unsupported by proof of its existence, should not, in our opinion, warrant a great outlay of money in remedial measures in anticipation.

We proceed. We determine the piling, caisson, bottoms, and general foundations of the piers, to be of the most complete and careful character, and they are, up to the

present hour, without any approach to decay, or in any manner altered from their original and perfect condition. We are borne out in this our view of the permanent character of the foundations, from the exceedingly small sum of the settlements of the bridge, and the certainty, as it appears to us, that such settlements should not be attributed wholly to the influence of sinkings or decay, but may, without impropriety, be divided between the alteration attendant upon the opening of such a work, on the removal of the centerings, &c., together with such change as time may be expected to produce, without fairly inducing a character of decay; and even then, the average difference between any points of this extensive work being five inches, the quantities are small, and are rather to be regarded as matter of curious inquiry, than as changes or differences attributable to the failure of the piers or foundations.

Upon the careful examination of the piers, and particularly of such of them as low water has enabled us actually to see, and to pursue inquiry upon, we have found our expectations most fully realized; the result is, our thorough conviction that no change has taken place in the state of the foundations, or of the piers themselves; and that there does exist no necessity for other or more expensive measures, or more extensive repairs, or of any other character than such and so many as we shall hereinafter specify in a general summary.

It may here be proper to observe, that we have been influenced in some measure in an opinion of the sound character and condition of these, from the information afforded us by several papers we have seen relating to them, of an authentic character, and bearing directly and most importantly on the subject. Among these papers we find an unpublished letter from Mr. Mylne himself, to Professor Robinson, bearing date 1799, in which we have his own

statement of the fact of there being from seventy to one hundred piles under each of the piers; a greater average number than are used in the construction of the New London Bridge, with larger piers, and carrying arches of a greatly larger span, and consequently weight.

We also observe, both by practical examination and by information, and have found by accurate search and inquiry, that the caisson bottoms do in most instances rest immediately and directly on the bed of London clay, or in the same immediate and direct manner on a permanent bed of hard gravel, varying from nine inches to two feet, which it is palpably evident was deemed permanent in the fullest extent by the architect, and which as certainly has realized his anticipation by remaining perfect: it is at this moment entirely undisturbed.

These facts duly conisdered, will be found sufficient to account for the small amount of settlement in the work, and assures us only the more strongly how little is to be feared for the stability of the foundations.

As regards the scour, it is our opinion that the irregularities and the present section of the river under the bridge, has itself in great part produced the scour; that although the removal of the Old London Bridge may have influenced the scour, all injurious effect to the structure will be removed by a careful restoration of the original and proper section of the river.

References to our section of the river in plan A, will point out the difference between the original bed of the river at the completion of the bridge, and its present condition, the red line indicating the present bed. By this it will be perceived, that an irregular deposit has taken place across the entire section, averaging an increase of from eighteen inches to eight feet above the original bed. This accumulation, and consequently lessening of the section of the water-way, in our opinion induces all the inju-

rious scour now existing through the bridge; and we say with confidence, that the holes and inequalities to be found near some of the piers, are to be attributed to this cause.

We find that these holes and inequalities do in no instance extend below the levels of the caisson bottoms, nor do they, in their present state, at all endanger the stability of the structure.

As a remedy for this scour, which has produced the effects of which we speak, it is our opinion that it is necessary simply to effect a careful restoration of the original section of the river, and so increase the water-way to its original quantity, or to the approximation of it, indicated by the dotted line on the section of plan A; and while, by this means, the entire section recovers that figure, which experience shows will withstand most effectually the action of the stream, it will, by an equal distribution of the increased quantity of water now to be disposed of, by the removal of the obstruction of the Old London Bridge, so dispose of it, as effectually to allay all present apprehension, and prevent all future danger.

The sum of the differences between the present and original beds, thus affording the quicker and more equal distribution and passage of the waters, the permanency of the bed will be secured. This proceeding will provide free passage for the under current, which is always the most likely to disturb the equilibrium and uniformity which should especially exist in the neighbourhood of the piers of bridges and contracted streams.

It is important to the present consideration to observe that the permanent bed of the river is not a fortuitous result, which has arisen from the flux or reflux of the waters, but both; that the determination of the bed itself, and the form of section under the bridge, result from the progressive agency of causes in constant operation.

Stability has been induced in those portions of the bed

which have not been exposed to scour and alteration from various and accidental causes, by the filling up and smoothing of irregularities, and thus lessening the changing causes. The tenacity of the bed necessary to permanency has been produced by lining it with stone, gravel, and coarse sand, from which all destructible, light, and fragile matters have been washed away.

It will be perceived by our opinion upon the division of the undertaking, and our explanations regarding the general condition of the structure, that the engineer, Mr. Mylne, had, at the time the work was proceeding, kept in view all the consequences of a removal of Old London Bridge; and that, in the contemplation of such a removal being within probability before time or accidental causes should have produced any injurious changes in the stability of the Blackfriars Bridge, he did accordingly provide, in a very great degree, for such changes or exigencies as might at any time present themselves.

In concluding our observations upon the foundations and bed of the river, we are decidedly of opinion that any operation of piling, in the close and immediate neighbourhood of the foundations of the piers, would produce immediate injury by an actual disturbance; and we oppose our opinion to any alteration, other than a permanent removal or restoration of the original bed of the river.

We shall next proceed to the examination of the cut-waters or foundations of the columns, and the bridge recesses. The extraordinary decay and breaking up of these portions of the structure, demand the much larger share of attention and outlay: we refer to all those parts comprised between the extreme height of high, and the level of low water.

Reference to the plans A, B, and D, will explain the quantities and character of the alterations and repairs we advise.

The angular figure of the present cut-waters have, in a very great degree, hastened the destruction which has arrived to the whole of them. Their small elevation, and the circumstance of their being exposed so continually to blows from craft, and from the blocks of ice which accumulate in their neighbourhood, would render it advisable to alter their figure from the acute angle they now make, to a figure which would possess more passive strength, while it offered the smallest practicable quantity of resistance. We should probably use the elliptical figure shown, in the third drawing upon plan A. By a reference to this plan, which we have placed immediately under the original, to ensure an easy perception of the alterations proposed, and the places and quantities of their difference, it will be seen that our intention in this deviation from the present cut-water has been to produce an approximation to those of the Waterloo and the London Bridges, upon the principle that they offer no parts which craft could injure, or upon which, as at present, they could injure themselves.

Reference also to the elevations of the centre arch, piers, and cut-waters, plan B, will show that we consider the base of the columns would be improved by being carried up to the height of one entire and additional course of masonry, making four courses under the immediate bases of the columns, in place of the three at present existing; and which, from their want of sufficient height, occasion the bases of the columns to be submurged with the alteration in the ordinary spring tides, whereby they are exposed to decay and to accident.

The material we should propose for the facings, and the renewal of the piers and abutments, should be stone of such hard and permanent character, as would effectively withstand any blows or shocks to which common accident may be expected to subject them. Granite would in its

hardness and durability, as well as in its appearance, amply repay the cost and labour incurred in its use; particularly if the vertical joints now existing on the faces of the cut-waters were removed, as shown in our elevation, plan B, and which, from the needless resistance they offer, and the facilities they present for the opening of the joints by the action of the water, we would advise.

A very considerable share of the destruction of the cut-waters of the Blackfriars Bridge has arisen directly from the repeated blows they receive from craft in their transit, and from floating ice, on the angles forming those joints, the necessity for the removal of which must therefore be apparent. The expediency of this measure is supported to common observation, by the acknowledged superiority in this particular of the New London and the Waterloo Bridges.

Inquiry also among the craft proprietors has satisfied us that the alteration is called for, from the not unfrequent recurrence of accident both to the faces of the piers themselves, and the heavy craft, which, in the present condition of the navigation, can by no ordinary skill be prevented from running upon them.

The alterations to the columns, rendered necessary by the carrying up of the cut-waters and the bases of the columns, will materially improve their architectural appearance, and advantageously increase their strength: they will also, from that greater elevation, be less exposed to danger; and from the renewal of their bases, and one-third of their shafts in granite, (to correspond with the cut-waters), they may be considered proof against all further injury or dilapidation.

We should propose, in the renewal of the lower portion of the column, to introduce a sufficiently strong wrought-iron shaft within each column through its centre, and

having such foothold in the circular portion of the piers which support their bases, and running so far into the height of the column, as effectually to secure them from any blow from craft to which they may be exposed, and permanently secure the lower portion of the column against all danger of future displacement.

This alteration will obviate the necessity for the injudicious iron struts, as they are now introduced between the backs of the columns and the faces of the pilasters, and which, in a practical point of view, afford little or no advantage, except against a direct shock; and even in many such cases they have failed in that object, for in such of them as have been struck, permanent alteration of the strut has taken place, which now has the effect of holding those portions of the shaft with which they are connected, out of their places.

In the strengthening we propose for the columns, any shock offered directly or obliquely to them, will be met with an equal resistance, not from the shaft of the columns, but from the provision which each will contain within itself.

The next important point for consideration is the watermen's stairs. These, together with the abutments and the contiguous walls, should be renewed in their defective portions with granite, and the whole of the stairs and landings (to be efficiently executed) require to be relaid with the same material.

The causeway we advise to be considerably lowered, and also rendered permanently sound and effective, by the introduction in their relaying of such granite and large stones as may be suitable, and not used up during the progress of the general repairs—as the granite steps, &c., which at present form part of the watermen's stairs, &c.

The caps of the columns, the architraves, the cornice blocks, &c., will require, in some instances, to be renewed,

and in every instance to be reworked, cleaned, and carefully pointed: we find considerable dilapidation in these parts.

Reference to our plan D, and to the upper figure, explains more particularly how we propose to effect the restoration of the balustrade. It will be perceived that we deem it necessary to increase the strength and width of the pedestals, against which the half balusters set; and to effect this, we propose to reduce the number of balusters from twenty-one, the present number between the pedestals, to twenty. This will not be regarded as an architectural alteration of the balustrade, or as affecting its appearance other than beneficially, from the additional strength it affords the pedestals, which are now small, while it furnishes some provision against the recurrence of such accidents as have, not unfrequently, precipitated large portions of the balustrade and pedestal into the river.

By thus removing one baluster in twenty-one, reworking such of the others as may be found to admit of it, and setting a new capping on the entire run, we should produce a sound and really efficient and elegant balustrade; and this at no very considerable outlay, considered as to the extent and importance of this division of the work.

The increased pedestals, while they will afford strength to the balustrade, will also offer strength enough to carry such standards for the lamps as may be required.

For such standards, we have submitted several designs on the drawings, to which we refer.

Should it be in the contemplation of the Committee to alter the architectural character of the balustrade, and to replace it (as being the least expensive mode of doing so) with a parapet wall, we have in the lower figure of plan D, prepared a design in which we scrupulously preserve all the projections of the pedestals, their places, mouldings, and

general design, and, as far as is consistent or practicable with such an alteration, we have maintained the spirit and general character of the architecture.

The reduction and reworking of the architraves, blocks, and cornices, with the renewal of the defective and broken stones throughout, inclusive of the capping to the parapet, the pavement on each side of the bridge, with the watermen's stairs, and (if the first figure on plan D, be approved and adopted) of the balustrades, with the lamps and standards, will comprise succinctly, and we believe comprehensively, the further alterations and repairs we have contemplated and submitted to your Committee.

The estimate for the execution of the above repairs and additions has been carefully made and revised, with a view to effect such further reductions as might by possibility be introduced to diminish the amount, consistently with the effectual and permanently durable execution of the work; and we are gratified to be able to compute it in the entire amount at forty-eight thousand three hundred pounds. The detail and specific appropriations of the several sums we have not considered it necessary to annex, but we hold ourselves ready to furnish an abstract of our calculations upon the subject, for the better guidance, and at the pleasure of the Committee.

Should the Committee be pleased to approve the designs and arrangements of the present plans, it may be satisfactory to know, that one pier and arch, taken by itself experimentally, can be completely restored according to our specification in the space of four months, at an expense of six thousand five hundred pounds, being its own proportion of the aggregate amount required, with a small addition for the expenses necessarily attendant upon the first commencement of a work of this extent, and which would not equally apply to the remaining portions.

Or should the Committee prefer such temporary provision only against the effects of the scour and further dilapidation, as might preclude the possibility of danger and risk of stability, we are assured that a small sum judiciously expended would secure the bridge against all risk for four or five years, during which time your Committee might deem it advantageous to institute a careful and regular course of observation on the then new action of the stream, of its precise effect on the structure, and of their mutual working on each other; so that, without an inconvenient or injurious lapse of time, and with the opportunity of more deliberation, and in perfect security, your Committee might themselves verify the observations and advice already submitted to their notice by the undersigned and other engineers, whose opinions your Committee have done them the honour to entertain.

R. MACDONALD STEPHENSON.
CHARLES J. BLUNT.

London,
Aug. 26, 1833.

List of Patents

Granted in Scotland, from 22nd March to 31st May, 1833.

(Continued from Vol. II. Page 370.)

To John Obadias Newell Rutter, of Lymington, in the county of Southampton, wine merchant, for an improved process for generating heat, applicable to the heating of boilers and retorts, and to other purposes for which heat is required.—Sealed 22d March.

To Samuel Hall, of Basford, in the county of Notts, cotton manufacturer, for an improved method of lubricating the pistons, piston rods, and valves or cocks of steam

engines, and of condensing the steam of such engines as are worked by a vacuum produced by condensation, which method of condensation is applicable to other useful purposes.—Sealed 25th March.

To Thomas Moore Evans, of Birmingham, in the county of Warwick, merchant, in consequence of a communication from a certain foreigner residing abroad, for certain improvements in machinery for preparing and dressing flax, hemp, and other fibrous materials.—Sealed 2d April.

To George Rodgers, of Sheffield, in the county of York, merchant, and John Tatam, of Hilton, in the county of Derby, gardener, for an improved button.—Sealed 24th April.

To Claude Marie Hilaire Molinard, of Bury-street, Saint Mary Axe, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner resident abroad, for certain improvements on looms, or machinery for weaving fabrics.—Sealed 24th April.

To James Brown, of Margaret-street, Commercial-road, in the county of Middlesex, rigger, for certain improvements in capstans, and apparatus to be used therewith.—Sealed 24th April.

To Thomas Spinney, of Cheltenham, in the county of Gloucester, gas engineer, for an improved earthenware retort for generating gas for the purpose of illumination.—Sealed 26th April.

To William Graham, jun., of the city of Glasgow, cotton spinner and power-loom manufacturer, in consequence of a communication made to him by a certain foreigner, for an invention of a self-acting temple to be used in the operations of weaving by power or hand loom.—Sealed 15th May.

To George Harris, of East Woolwich, in the county of Surrey, Esq., a captain in His Majesty's royal navy, for a method for the reducing and preparing various vegetable substances (not hitherto in use for like purposes), and for the manufacturing them into articles in general use heretofore usually made from hemp and flax.—Sealed 15th May.

To Robert Stein, of Edinburgh, Esq., for an improved steam engine on the rotary principle.—Sealed 16th May.

To George Frederick Muntz, of Birmingham, metal roller, for an improved manufacture of metal plates for sheathing the bottoms of ships or other such vessels, and also of bolts and other the like ships' fastenings.—Sealed 16th May.

To William Harrold, of Birmingham, in the county of Warwick, merchant, in consequence of a communication he had from a certain foreigner residing abroad, for an improvement or improvements in machinery for making or manufacturing paper.—Sealed 21st May.

To Christopher Robinson, of Athlone, in the county of Roscommon, Ireland, distiller, for certain new or improved machinery for transferring caloric from aeriform or fluid bodies to other bodies of the like description, and applicable to other useful purposes.—Sealed 21st May.

To Archibald Douglas, of Manchester, in the county of Lancaster, manufacturer, for certain improvements on power looms, and the shuttles used therein.—Sealed 31st May.

To Thomas Spinney, of Cheltenham, in the county of Gloncester, gas engineer, for a new combination of materials for the manufacture of crucibles, melting pots, and fire bricks.—Sealed 31st May.

New Patents

Granted in England, 1833.

To William Godfrey Kneller, of Mitcham, in the county of Surrey, chemist, for his invention of certain improvements in evaporation.—Sealed 24th August—6 months for inrolment.

To Richard Else, of the city of Bath, gentleman, for certain improvements in drying malt.—Sealed 7th September—2 months for inrolment.

To William Church, of Heywood House, Bordesley Green, near Birmingham, in the county of Warwick, gentle-

man, for certain improvements in machinery or apparatus, to be employed in the transportation of goods or passengers, parts of which said improvement are also applicable to the ordinary purposes of steam engines.—Sealed 7th September—6 months for inrolment.

To Isaac Dodds, of Horseley Iron Works, in the parish of Tipton, in the county of Stafford, engineer, for an improved combination of materials, and method of manufacturing valves for steam engines, or steam apparatus, or for any other fluid, or gas, or in any other situation wherein valves or sluices may be used.—Sealed 14th September—6 months for inrolment.

To John Heathcoat, of Tiverton, in the county of Devon, lace manufacturer, for his invention of certain improvements in machines or machinery used in the manufacture of bobbin net.—Sealed 14th September—6 months for inrolment.

To John Scott Howard, of Chow Bent, in the county of Lancaster, machine maker, for his invention of certain improvements in machinery, called roving frames, for roving cotton and other fibrous substances.—Sealed 21st September—2 months for inrolment.

To Louis Cournier, of Kennington Green, in the county of Surrey, gentleman, for an improvement in curing certain maladies of the head, being a communication from a foreigner, residing abroad.—Sealed 21st September—2 months for inrolment.

To Fitz Walter Williams, of Gilbert-street, Oxford-street, in the county of Middlesex, gentlemau, for his invention of a liquid or composition, for polishing furniture, and other articles which he intends to denominate, Williams's French polish reviver.—Sealed 21st September—6 months for inrolment.

To John Robertson, of Crofthead, in the parish of Neilston, and county of Renfrew, cotton spinner, for his invention of certain improvements in the mule jenny, or other machine for spinning of cotton, and in the belly-stretching frame, or other machine for the roving of cotton, and in the machinery for spinning and roving of silk, wool, flax, hemp, or other fibrous substances.—Sealed 21st September—6 months for inrolment.

CELESTIAL PHENOMENA, FOR OCTOBER, 1833.

D.	H.	M.	
1	0	0	Clock after the Sun 10 m. 19 s.
—			☉ rises 6 h. 2 m. sets 5 h. 37 m.
			☽ rises 7 h. 3 m. P. M. sets 8 h. 18 m. A. M.
—			Moon passes the meridian 14h. 19 m.
2	16	37	Jupiter's first sat. will immerge.
4	0	0	☉ in conj. with ☿
4	11	5	Jupiter's first sat. will im.
—			Occul ☽ and ζ in Tauri, im. 13 h. 44 m. em. 14 h. 44 m.
5	0	0	Clock after the ☉ 11 m. 33 s.
—			☉ rises 6h. 8 m. sets 5h. 28 m.
—			Moon rises 9 h. 10 m. P.M, sets 0 h. 58 m. P. M.
—			☽ passes the meridian 17 h. 45 m.
6	4	9	☽ in □ or last quarter.
8	0	0	Mer. R. A. 13 h. 12 m. dec. 6. 55. S.
—			Ven. R. A. 10 h. 46 m. dec. 8. 56. N.
—			Mars R. A. 13 h. 24 m. dec. 8. 26. S.
—			Jup. R. A. 2 h. 4 m. dec. 11. 0. N.
—			Sat. R. A. 12 h. 14 m. dec. 0. 46 N.
—			Georg. R. A. 21 h. 26 m. dec. 15. 54. S.
—			Vesta R. A. 19 h 18. m. dec. 26. 23. S.
—			Juno R. A. 15 h. 46 m. dec. 9. 4 S.
—			Pallas R. A. 7 h. 55 m. dec. 13. 16. S.
—			Ceres R. A. 9 h. 14 m. dec 21. 34. N.
10	0	0	Clock after the Sun 12 m. 56 s.
—			☉ rises 6 h. 17 m. sets 5 h. 17 m.
—			☽ passes the meridian 22 h. 32 m.
—			☽ rises 1 h. 45 m. A. M. sets 4 h. 36 m. P. M.
	7	16	☽ in conj. with ♀ long. 11. in Virgo ☽ lat. 4. 23. N. ♀ lat. 1. 5 N. dif of lat. 3. 18.
11	8	0	☽ in Perige.
	13	0	Jupiter's first sat. will im.
	17	0	☽ in conj. with Sat. long. 3. in Libra ☽ lat. 4. 58. N. Sat. lat. 2. 7. N. diff. of lat. 2. 51.
	8	34	☿ in conj. with ♂ diff. of lat. 7 m.
	5	21	☽ in conj. with ☿ long. 25 in Libra ☽ lat. 4. 28 N. ☿ lat. 26. N. diff. of lat. 4. 32.
	6	25	☽ in conj. with ♂ long. 26 in Libra. ☽ lat. 4. 46. N. ♂ lat. 22 N. diff of lat 4. 24.

D.	H.	M.	
	7	7	Ecliptic conj. or ● new moon.
	7	28	Jupiter's first sat. will im.
15	0	0	Clock after the sun 14 m. 8s.
—			☉ rises 6 h. 25 m. sets 5 h. 6 m.
—			☽ rises 8 h. 57 m. A. M. sets 6 h. 35 m. P.M.
—			☽ passes the meridian 2 h. 5 m.
16	0	0	Mer. R. A. 13 h. 55 m. dec. 11. 50. S.
—			Venus R. A. 11 h. 22 m. dec. 5. 29. N.
—			Mars R. A. 13 h. 45 m. dec. 10. 28. S.
—			Jupiter R. A. 2 h. 0 m. dec. 10. 36. N.
—			Saturn R. A. 12 h. 18 m. dec. 0. 24. N.
—			Georg. R. A. 21 h. 26 m. dec. 15. 56. S.
—			Vesta R. A. 19 h. 25 m. dec. 26. 8. S.
—			Juno R. A. 15 h. 55 m. dec. 9. 45. S.
—			Pallas R. A. 8 h. 8 m. dec. 14. 52. S.
—			Ceres R. A. 9 h. 27 m. dec. 21. 7. N.
18	14	54	Jupiter's first sat. will im.
20	0	0	Clock after the ☉ 15 m. 5 s.
—			Sun rises 6 h. 34 m. sets 4 h. 55 m.
—			☽ rises 2 h. 13 m. P. M. sets 10 h. 20 m. P.M.
—			☽ passes the meridian 6 h. 30 m.
		5	☽ in □ or first quarter.
	9	23	Jupiter's first sat. will im.
22	6	0	♀ in Perihelio.
23	2	25	☉ enters Scorpio.
	7	0	☽ in Apoge.
	17	0	☉ in opposition to ♃
25	0	0	☿ in Aphelia
—			Clock after the ☉ 15 m. 47 s.
—			☉ rises 6 h. 43 m. sets 4 h. 45 m.
—			☽ rises 4 h. 16 m. P.M. sets 2 h. 43 m. A.M.
—			☽ passes the meridian 10h. 13m.
27	13	26	Jupiter's first sat. will imm.
27	18	9	☽ in conj. with ♃ long 29. in Aries. ☽ lat. 4. 40. S. ♃ lat. 1. 31. S. diff. of lat, 3. 9.
28	0	0	♅ stationary.
	3	48	Ecliptic oppos. or ○ full moon.
29	0	0	♀ in conj. with ♄ diff. of lat. dec. 28 m.
	7	55	Jupiter's first satt. will emm.
31	0	0	Occul. ☽ and ζ in Tauri, im. 21 h. 11 m. em. 21 h. 25 m.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR AUGUST AND SEPTEMBER 1833.

1833.	Thermo.		Barometer.		Rain in inches.	1833.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low			Hig.	Low	Hig.	Low.	
Aug.						Aug.					
26	67	39	30,29	Staty.		11	63	51	29,76	29,66	,075
27	67	40	30,25	30,19		12	63	43	29,93	29,84	,175
28	70	39	30,08	29,99		13	61	37	29,39	29,84	
29	71	42	29,91	29,76		14	66	36	29,84	29,82	
30	64	41	29,70	29,40		15	67	34	29,86	Staty.	,025
31	51	43	28,99	28,91	,6	16	64	40	29,73	29,67	
Sept.											
1	53	41	29,44	29,31	1,675	17	63	43	29,69	29,51	,375
2	53	37	29,61	29,53	,025	18	63	41	29,82	29,71	
3	55	41	29,67	29,62	,05	19	61	41	29,98	29,87	,15
4	61	39	29,89	29,75	,1	20	62	39	30,14	30,07	,1
5	61	36	30,26	30,15		21	63	36	30,15	30,07	
6	63	39	30,23	30,12		22	60	39	29,98	29,97	
7	61	38	30,07	30,00		23	65	41	29,94	29,83	
8	62	39	29,93	29,80	,025	24	66	44	29,71	29,60	
9	63	42	29,80	29,70	,075	25	64	43	29,60	29,51	,075
10	65	49	29,98	29,89							

Edmonton.

CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES,

AND

REPERTORY

OF

PATENT INVENTIONS.

No. XIX.

CONJOINED SERIES.

Recent Patents.

To JAMES MACDONALD, *of the University Club-House, Pall-Mall, East, in the parish of Saint Martin-in-the-Fields, in the county of Middlesex, gentleman, for an improvement or improvements in the construction of Bridges made of iron or other materials, communicated to him by a foreigner residing abroad, which invention is also applicable to other useful purposes.*—[Sealed 22d January, 1833.]

THESE improvements, in the "construction of bridges or arches made of iron, or other materials," are founded upon the same principles as those set out in the specification of a patent granted to me for "an improved construction of

railway," dated the twenty-ninth day of June, one thousand eight hundred and thirty-two, which specification was duly inrolled in Chancery in the office of the Rolls Chapel, on the twenty-ninth day of December in the same year, and to which I refer, the better to elucidate the principles of the present invention, see Vol. II., Conjoined Series, page 158, and Plate VIII.

These improved bridges, or arches, are constructed by combining series of iron bars or ribs, so arranged and connected as to sustain or support the pressure and tension of each other; the whole, when combined, constituting an expanse of frame work, in the form of the segment of a polygon or arch, upon the upper surface of which frame-work, the floor of the bridge or carriage-way, or covering of a roof is to be laid.

The principle on which the tension and support of the frame-work is founded, may be illustrated by reference to the principle of construction in the rafters, tie-beam, and king-post of roofs; the structure of the bridge consisting of combined rafters, with tie-beams and king-posts intersecting each other, and connected in parallel ranges by transverse bolts and diagonal braces, for the purpose of firmly securing the whole structure.

In the accompanying drawings, Plate IX., fig. 1, represents a combination of horizontal, diagonal, and perpendicular bars or rails, secured by screw nuts at their junctions. This combination of bars or rails, constitute two elementary portions of the arch, each of which portions is called a bay. A series of these portions, when connected in a range, produce the arch shown at fig. 2.

These bars, or ribs, are constituted, by preference, of malleable iron, by means of rolling; their dimensions, of course, depending upon the magnitude of the bridge to be erected, and may be formed with projecting ribs on their

sides, if necessary, to give additional strength. These series of bays, or elementary portions, are to be combined in pairs, in the way described in my former specification, and connected together by transverse bolts and diagonal braces, which, when so combined, constitute an expanse of frame-work in the form of an arch.

In constructing these improved bridges, two, four, or more of such pairs of arches of frame-work are placed side by side, in parallel ranges at proper distances, according to the required width and necessary strength of the bridge, which arches of frame-work are to be connected by diagonal bracings or stretchers, or both, in the manner shown in fig. 3, which is a plan view of the frame of a bridge consisting of two pairs of arches of frame-work, or four series of bays or elementary segments, and also in fig. 4, which is a transverse section taken across the bridge, but drawn on the same scale as fig. 1.

The manner of combining the several bars or ribs, in constructing the elementary portions or bays of the frame-work, and also the continuous connexions of the same to form any given length of frame-work, and to constitute an arch, having been explained in the former specification, the Patentee proceeds to describe the manner in which the several pairs of arches of frame-work are to be connected to constitute the frame-work of an entire bridge.

In fig. 3 and 4, *a*, *a*, *b*, *b*, are four series of bays of frame-work, that is, two and two connected together, in pairs by transverse stretcher bolts *c*, *c*, and diagonal pieces *d*, *d*, and firmly secured or braced together by the screw nuts on the ends of the stretcher bolts. This connexion of the sides or ranges of frame-work may also be further strengthened by the plates *k*, *k*, which are intended to support the flooring or carriage-way of the bridge.

The several pairs of arches of frame-work are connected

together by horizontal and vertical diagonal pieces *e*, *e*, and *f*, *f*, placed between the pairs, and secured by screw nuts on the ends of the stretcher bolts *c*, *c*, or, instead of horizontal, diagonal connecting pieces, stretcher bolts *g*, *g*, may be used for the same purpose with good effect, or both may be employed, as shown in fig. 3; *h*, *h*, are the top rails, which are formed by two rebated pieces connected to the top of the frame-work by screw nuts and collars; *i*, is the curb fixed upon the top rails supporting the balustrades, and the ends of the plates *k*, *k*, upon which the road-way is to be laid, also bear upon the top rail.

It will be obvious, that from the peculiar mode of combining the several parts of the frame-work, and from the manner in which the several portions tend to support each other, and produce a nearly equal tension and compression of all the parts; bridges, with very flat arches, may be constructed on this improved plan, and as the spring or rise of the arch may be varied to suit the length or span, or the design of the builder. It is only necessary to remark, that all the perpendicular bars (or those which correspond to the king-posts of a roof,) must be in the position of radii, from the centre of the circle, of which the arch is a segment. Therefore, the distance between the upright bars *l*, *l*, will be greatest at the point where they unite with the top rails *h*, *h*, and the length of the top rails, being determined by the length and spring of the arch, or segment; the relative length of the middle and lower tie-bars, or chains *m*, *n*, must always depend on the length of the upright bars *l*, *l*, (or depth of the bridge); and consequently, the distance between the holes, made in the diagonal bars of the frame-work, for the bolts *c*, *e*, to pass through, in connecting them to the middle and bottom tie-beams, or chains *m*, and *n*, will be less than the distance between the holes made in the same diagonal bars, for the

bolts in the middle tie-chain *n*, and top rail *h*, to pass through. Fig. 5, is a plan view of a portion of the lower tie chain *n*, and fig. 6, and 7, are views of a portion of the middle tie-chain, or beam *m*.

As the bridge or arch is intended to support its own weight, by the tension of the middle and lower range of tie-bars or chains, it may be erected upon piers at its ends, which merely sustain the downward pressure, but as these improved bridges are intended to depend upon the two principles of tension and resistance, it is proposed to raise abutments upon the end piers. Therefore, in constructing these improved bridges, the ends of the top rail and middle tie-beam, is made to bear against the abutments *p*, *p*, leaving a small space between the end of the bottom tie-beam or chain *n*, and the abutment, in order to allow of its extending, as the deflection of the arch takes place on any superincumbent weight passing over the bridge, or by the expansion or contraction of the metal under variations of temperature. Fig. 8, is a side elevation of a bridge, the road-way of which is made level by supporting it upon pillars or spandrils, extending from the top rails, or frame work of the bridge. It will be evident, that arches of frame work, constructed upon this improved plan, from their capability of sustaining their own weight, when resting upon piers without lateral abutments, may be used to form the frame-work for the roofs of buildings with good effect; and, also that the same description of arches of frame-work, may be used to support aqueducts, viaducts, or be used for any other such purpose, but which it is not thought necessary particularly to describe, as the same principle of construction is used in all.

Lastly, I wish it to be understood, that I do not claim the exclusive use of any of the parts herein employed, if taken separately and applied to other purposes than the

erection of bridges, or arches for roofs of buildings, aquaducts or viaducts, but I do claim, as the subject of this invention, the combination of the said parts, when applied to the construction of bridges or arches of frame-work, possessing the advantages of both the principles combined, of tension and lateral resistance.—[*Inrolled in the Rolls Chapel Office, July,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To John Howard Kyan, *of South-row, Euston-square, in the county of Middlesex, esq., for his having invented a new mode of preserving certain vegetable substances from decay.*—[Sealed 31st March, 1832.]

The subject of this patent is a mode of operating upon wood by a chemical compound, in order to prevent the premature decay called dry rot: the mode is by saturating the wood in a poisonous liquor, inimical both to animal and vegetable life, which, by remaining in the pores of the wood, prevents the generating of animaculi, and consequently the destructive or rotting effects produced by them. The following is the Patentee's description of the process to be employed:—

Having prepared or constructed a large tank, or reservoir of wood, or other suitable material, I fill it about two-thirds full of deutochloride of mercury, or, as it is more commonly called, corrosive sublimate, dissolved in hot or cold water, or both, in the proportion of one pound of corrosive sublimate, to five gallons of water; and into the

liquid I put the vegetable substances to be acted upon where, keeping them completely covered by the liquid, I steep them for various periods, from fourteen to twenty-one days, according to the nature of the substances to be acted upon.

The certain vegetable substances alluded to in my said patent, are as follows, (that is to say): all kinds of wood, or timber, used for ship or other building, as also for carpenters, wheelwrights, turners, and cabinet work, and these will require to be steeped in the liquid from fourteen to twenty-one days, according as the wood is more or less porous, and difficult of entrance for the liquid, the more porous requiring the least time.

Now, whereas, I claim as my invention, preserving from decay, the certain vegetable substances hereinbefore described, by immersing and saturating, or by steeping or soaking the same in, or with a solution of corrosive sublimate and water.—[*Inrolled in the Inrolment Office September*, 1832.]

To George Oldland, *of Hillsley, in the parish of Hawkesbury, in the county of Gloucester, cloth-worker, for his having invented or discovered certain improvements in machinery, or apparatus for shearing, dressing, and finishing of woollen cloths and other fabrics.*— [Sealed 3rd March, 1832.]

My present improvements in machinery, or apparatus for shearing, dressing, and finishing of woollen cloths and other fabrics, consist in certain variations in, and additions to my

former machinery, or apparatus for shearing and dressing woollen cloths, for which his present Majesty, King William the Fourth, granted to me His Royal Letters Patent, and the Great Seal of Great Britain, dated at Westminster, the 22d day of July, in the first year of his reign, to make use, exercise, and vend the same in England, the specification of which was duly inrolled in the Rolls Chapel Office on or before the 22d day of January, in the year of our Lord 1831. [See Vol. I, conjoined Series, p. 21.]

By referring to my aforesaid specification, it will be seen, that in the first place I employ disc-formed cutters, working against a straight bar of steel, commonly called a ledger blade, for the purpose of shearing or cropping the pile off the cloth; in my present improved machine, I construct the said ledger blade in a semi-circular form, the cutters being made to traverse round against its edge, for the purpose of producing the said effect of shearing or cropping the pile.

" The second feature of my former invention applied to machinery for raising the pile of woollen cloths, and consisted in so constructing and connecting the frames or holders in which teasles, cards, or brushes were mounted, as to enable them to traverse round against the face of the cloth, stretched out over a bed or table; my present improvement is designed to give elasticity to the bearings of the said bed or table; or to the frames or carriages in which the teasles, cards, or brushes are mounted: in order that the points of the teasles or cards may act more equally, and with better effect, upon the cloth in raising the pile or nap.

In addition to these improvements, I also, after the pile of the cloth has been raised, introduce currents of air to act upon the cloth as it passes through an ordinary gig-mill, or brushing or dressing machine. The object of which is

to promote the evaporation of the water contained in the cloth, while under the dressing operation, and to cause the nap to be laid or fixed by such drying.

" Fig. 1, in the accompanying drawing (see Plate X), represents a horizontal or plan view of the operative machine for shearing or cropping the pile off woollen cloth: *a, a, a,* is the semicircular blade of steel, constituting the ledger blade; *b, b, b,* are the disc-formed cutters working round upon the edge of the ledger blade.

" These cutters are mounted upon perpendicular spindles, attached by loops to the periphery of the large wheel *c, c, c, c*; and upon each spindle there is a toothed pinion, which, as the wheel goes round, takes into the semicircular rack *d, d, d,* and thereby gives to the disc cutters a quick rotary action. The wheel *c,* the ledger blade *b,* and the rack *d,* are supported by suitable means in the upper part of the framing of the machine; and the wheel is driven round by a band and pulley, as shown, or by any other convenient means.

" Though I have shown in the drawing the disc cutters acting in conjunction with the concave edge of the ledger blade, I do not confine myself to that precise situation, as they may be made to act in conjunction with the convex edge of a ledger blade, by a little variation in the comparative dimensions of the part. It is therefore to be understood that my claim of invention, as respects the shearing machine, is confined to the adaptation and employment of a semicircular or segment-formed ledger blade in connection with rotary disc cutters.

" The mode in which I apply my improvements to the machine for raising the pile of cloth, is shown in the Plate at fig. 2, which represents a side view of what I denominate a " traversing gig, or raising machine:" *a, a, a,* repre-

sents the cloth under operation, which is drawn from a scray *b*, through the machine, and delivered on to the scray again, as in the ordinary construction of a Yorkshire gig-mill; *c*, *c*, *c*, are the frames, or circular carriers, which hold the teasles, cards, or brushes. These frames are fixed on spindles *d*, *d*, mounted in bearings, or longitudinal bars, extending along the machine, and made fast to the standards *e*, *e*, at each end, in the way described in my former specification, or by any other convenient mode, but in reversed positions; the spindles and frames being driven round by bevil gear, or any other suitable means.

"The bed against which the cloth is intended to bear, is shown at *f*, which is a bar of wood, or it may be of metal. To the underside of this bar a brush is affixed, or an air cushion, with an Indian rubber cover, which is intended to constitute an elastic bearing for the cloth, or an elastic resistance against the action of the teasles, cards, or brushes. This, however, does not materially differ from the bed described in my former specification, and therefore is not intended to be claimed in this; but the particular features of novelty are the springs on which the bar *f*, rides, and the springs which bear up the teasle frames *c*, *c*, either or both of which may be employed.

The bar *f*, extends across the machine from side to side, and is elongated beyond the extent of the elastic bed, for the purpose of being enabled to slide up and down between the side rails of the standards, which elongations, or ends of the bed bar, bear upon the springs *g*; one such spring being placed at each end, resting upon a rail *h*, in the side standards. Here, however, I must remark, that though I have shown springs made in the form of two spirals or cones united, yet I do not intend to confine myself to such forms, as various other descriptions of springs placed so as to support the bed, and allow of its

giving way to the pressure of the cloth, and the teasles or cards might equally well answer the purpose.

As respects the elasticity of the frames or carriages in which the teasles are mounted, I adopt two contrivances; the one is a cushion covered with Indian rubber, and inflated with air, which I place under the teasles or cards, as an elastic bearing; the other is an introduction of helical springs round the spindles, as at *k*, the spindles being made in two parts, socketed and keyed together, as shown in the detached sectional figure 3.

By these means, it will be seen that whatever irregularity occurs in the pressure of the teasles or cards against the cloth and the bed as they go round, the elasticity of the bed, and also of the teasle frames, will allow them to give way, and afford the necessary relief.

In order to limit the action of the cards or teasles upon the cloth to diagonal directions, from the middle of the cloth towards its lists, I have constructed the bed of the traversing gig in the manner shown at fig. 4, *m*, *m*, *m*, being those parts of the brush board which are covered with bristles, and *o*, *o*, *o*, those parts of the board that are left blank or free from bristles, by which it will be seen that the circular teasle frames or cards act upon the cloth, only at those parts where the dotted circles cover the bed *m*, and, consequently, as the cloth passes under them, the pile or nap will only be raised diagonally in the way stated.

It will be obvious to all acquainted with the operation of shearing cloth, that in a machine where the ledger blade is simicircular, or other segment shaped, as in the first figure, that a corresponding formed bed must be adopted, and that the cloth must be distended or kept stretched to its proper tension by means of a counter bed or guard on the upper surface of the cloth, and also, that the operative part of the

shearing machine may be brought into action upon the surface of the cloth, by carrying the cutters and ledger blade over the cloth, along its whole length, or that the whole length of the cloth may be conducted under the cutters and ledger blade; and that the machine may be made to cut backwards as well as forwards; I therefore do not confine myself to either, but adopt my machinery, as above described, to any other machinery by which the object may be effected. And as respects the raising and dressing the pile of cloths, I claim the application of springs as above described, to relieve the irregular action of the teasles or cards; and I construct beds as above said, by removing parts of their bearings in the manner shown; and in introducing a current of air to dry the cloth, I employ tubes or pipes placed in a convenient situation contiguous to the cloth, which tubes have air injected into them by a fire or other means, and emit the same into the cloth through slits or other apertures.—[*Inrolled in the Rolls Chapel Office, September,* 1832.]

Specification drawn by Messrs. Newton & Berry.

To Samuel Smith, *of Princes-street, Leicester Fields, in the parish of St. James, Westminster, in the county of Middlesex, gun maker, for his having found out or invented a new nipple or touch-hole to be applied to fire-arms, for the purpose of firing the same by percussion; and a new cap or primer for containing the priming by which such fire-arms are to be fired.*—[Sealed 9th August, 1830.]

The Patentee describes his invention in the following words:—"I hereby claim as my invention, and describe

the same to consist, in having altered the shape of the nipple or touch-hole, and having formed the circular or other shaped area of the nipple or touch-hole upon which the cap or primer (used for firing guns and other fire-arms by percussion,) is placed, much larger in circumference than any heretofore in use, and making in the centre thereof a small projection above the surface of the area of the nipple or touch-hole, to come opposite to the priming powder in the cap or primer (which is hereafter described.)

"My newly invented nipple or touch-hole may be formed of steel, iron, or any other metal or metals, or of any compound of metals, or of any substance sufficiently hard to sustain the blow necessary for exploding the priming powder, and may be formed from the solid metal of the breech of the gun or fire-arms, or of separate pieces of metal or metals, or compound of metals, or other fit substance as aforesaid, and be screwed or otherwise fixed or fastened into or upon the breech of the gun or fire-arms, as may be most convenient: I claim the using or applying my said invention either way.

"The outside circular or other shape of the cap or primer is formed much larger in circumference than any heretofore used, and must correspond in size with the nipple or touch-hole upon which it is intended to be applied, so as to enclose and cover the whole of that part of the nipple or touch-hole which rises or projects above the breech of the gun or fire-arms."

The priming powder, instead of being spread as in the usual method over the whole inside surface of the upper part of the cap or primer, is contained in a small cup or indentation formed in the centre of the inside surface of the upper part of the new cap or primer, to correspond with the projection formed on the outside and upper surface of the area of the new nipple or touch-hole.

"I do not confine myself to any size for the calibre of the cap or primer, or for the cup or indentation in the inside surface of the upper part thereof; neither do I confine myself to any particular shape for the cap or primer, nor for the nipple or touch-hole, as both the cap or primer and the nipple or touch-hole may be made octagonal, square, or of any other shape, but I prefer the circular shape as most convenient; neither is it absolutely necessary that a cup or indentation should be made on the centre, or any other part of the inside surface of the cap or primer, as I claim the benefit of using my said invention by placing the priming powder in the centre of a large diameter and even surface, as well as, and instead of, covering the whole of a small diameter with the priming powder, as has been the method in all caps heretofore in use.

"The cap or primer may be formed of any metal, or any other substance which will answer the purpose, but I prefer copper as most useful, and best adapted for the purpose, although I claim the benefit of using any other metal, or compound of metals, or other substance which will answer the purpose.

"And as a further description of my said invention, and in order more perfectly to distinguish the same from the old method, I have annexed hereunto several figures, (see Plate X,) figs. 5, 6, 7, and 8, represent my said invention, and figs. 9, 10, and 11, represent the nipple or touch-hole, and cap or primer now in use, thereby distinguishing my invention from the old, and hitherto more usual mode. Fig. 5, shews the new nipple or touch-hole when screwed into, or affixed to, the breech of the gun or fire-arms, with the projection above the surface of the area thereof. Fig. 6, shows a section of the new touch-hole or primer when detached from the gun or fire-arms, with the projection aforesaid. Fig. 7, is a side view; and fig. 8, shows the inside of the said cap or

primer with the cup or indentation in the centre of the inisde surface of the upper part thereof. Fig. 9. shows the nipple and touch-hole now in use, screwed into the breech of the gun or other fire-arms. Fig. 10, a section of the nipple or touch-hole now in use, when separate from the breech of the gun. Fig. 11, shows the cap or primer now in use."—[*Inrolled in the Rolls Chapel Office, Oct.* 1830.]

To JOHN WALKER, *of Weymouth-street in the county of Middlesex Esq., for his having invented, or found out an improved cock for fluids.*—[Sealed 4th May, 1830.

THE Patentee considers that the usual conical form of the plug of an ordinary liquor cock is objectionable, being apt to become loose, and consequently leaky. It is therefore proposed to form the plug of the improved cock, and also its socket, perfectly cylindrical; which is to be done by carefully grinding both so as to fit air and water tight, and to secure the plug into the socket, by a collar and screw nut at bottom.

Plate X, fig. 12, shows the contrivance, the barrel of the cock being in section : *a*, is the plug fitting accurately into the socket, having its lever or turning crutch at top, and the collar of leather, and metallic nut screwed at the under part, at *b*. The other parts of the cock are formed as usual.

Should it however be found that such construction of plug may be subject to leak from wear, the Patentee would, in that case, open the side of the socket by a perpendicular cut, which may be done by a fine saw; this would enable the socket to spring up and embrace the plug tightly. But in constructing cocks in this way, it would be desirable to

solder two ears to the sides of the cut, as shown in the horizontal section, fig. 13, when a screw *c*, might be passed through the ears for the purpose of drawing up the socket, so that it should fit tightly to the cylindrical plug.

Another contrivance is also proposed to effect the same object, which is shown in fig. 14. This figure represents a section taken perpendicularly through the socket and barrel, which is formed truly cylindrical within, fitting the cylindrical plug, but on the outer part as the frustrums of two cones. The side of the socket is opened by a cut in a perpendicular direction, as before described, and the conical parts having screw threads cut upon the screw rings *d*, *d*, are applied for the purpose of bringing the circular socket into a smaller circumference. Or the conical outer parts may be made without screw threads, and plain rings forced on for the same purpose.—[*Inrolled in the Inrolment Office, July,* 1830.]

To Sherman Converse, *of New York, in the United States of America, at present residing in Ludgate Hill, in the city of London, gentleman, for an improvement in making or manufacturing fire-grates.*—[Sealed Oct. 22nd, 1832.]

This invention consists, first, in attaching to the back of the common open grate, a chamber made of iron or other suitable material, so that the flame may pass through it to the flue or chimney; and, secondly, in elongating this chamber longitudinally, and above the bars of the grate or fireplace, so that the air may pass round the outside of the chamber, and thereby become heated; and, thirdly, by

regulating the chamber, whether elongated or not, by a valve, thereby regulating the rate of burning in the fire-place.

The specification consists of a very few words, the above being nearly the whole, and contains all the information given on the subject; how the chamber is to be connected, is not stated. It appears that the air which has been heated in the room, by the fire in the grate, undergoes a second process of heating on the outside of the chamber in the flue; but how it is again to be of service in the room, is not stated.—[*Inrolled in the Inrolment Office, April,* 1833.]

To JOHN ARNOLD, *of Sheffield, in the county of York, powder flask maker, for his invention of an improved spring latch or makefast for doors.*—[Sealed 26th January, 1830.]

THIS contrivance is a bolt, sliding in a socket, having a helical spring behind it, which projects the bolt outward, and allows it to be slidden back into its socket, when the outer extremity is pressed against, or when the bolt is drawn back by a pin or knob fixed in its side.

Plate X, fig. 15, is a section of the socket *a, a,* of a cylindrical form, and *b,* is the cylindrical bolt sliding within; *c,* is the helical spring behind the bolt; *d,* the door jamb, with the mortice, into which the bolt shoots when the door is closed. The cylindrical socket is let into the solid part of the style of the door, and is fastened thereto by a screw, in the way of an ordinary mortice lock. On closing the door, the inclined plane at the end of the bolt strikes against the

door jamb, and it is forced back into the socket, the helical spring behind giving way to the pressure; but on the end of the bolt coming opposite to the mortice hole in the jamb, the power of the spring shoots the bolt forward, and it locks into the mortice, as shown.

In opening the door, the knob or handle *f*, must be pushed sideways, which will slide the bolt back, and thereby withdraw the end of the bolt from the mortice hole of the jamb, when the door will be allowed to open.

The knob or handle *f*, may be connected to the bolt by a crank, as fig. 16, in which case it will be only necessary to turn the handle round in order to withdraw the bolt, instead of sliding it. When this kind of fastening is to be employed merely as a bolt, its end being flat, the pin of the knob *f*, is to be passed through a plate, as fig. 17, and the knob to be depressed into one of the notches of the plate, which will hold it fast.—[*Inrolled in the Inrolment Office, March*, 1830.]

To SHERMAN CONVERSE, *of New York, in the United States of America, at present residing at Ludgate-hill, in the city of London, gentleman, for an invention communicated to him by a certain foreigner residing abroad, for certain improvements in making or manufacturing metallic rails, for the construction of rail-roads.*—[Sealed September 29th, 1832.]

THE improvements in rail-roads, described in the specification of this Patent, is the application of longitudinal bars of iron, placed as tension rods under the rail, and from chair to chair successively, through the whole length of the

line of rail-road, so as to secure the chairs longitudinally; and also in the application of cross tension rods or stretchers, to be placed transeversely between the chairs and rails, so as to connect the whole crossways, and form a perfect security throughout the line; these cross tension rods acting at the same time as a stay and a brace; the whole being firmly connected by bolts, and secured by screw-nuts, wedges, or otherwise, as may be found the most desirable in the application of the same.—[*Inrolled in the Inrolment Office, March,* 1833.]

To TIMOTHY MASON, *of Great Portland-street, in the county of Middlesex, brush maker, for his invention of an improvement in the manufacture of painting brushes, and other brushes applicable to various purposes.*—[Sealed October 20th, 1830.]

THE invention described under this Patent, is an improved mode of fixing the knots, or small bundles of hair into the stock or handle of brushes, which is done by forming grooves in the stocks of the brushes, for the purpose of receiving the ends of the knots of hair, instead of the holes drilled into the wood, as in brushes of the common construction. These grooves are to be formed like a dovetail, or wider at the bottom than the top; and when the ends of the knots of hair have been dipped into cement, they are to be placed in the grooves and compressed into an oval form, by which the ends of the hair will be pressed outwards into the recess, or wider part of the dovetailed groove, or the grooves may be formed with threads or teeth on the sides, instead of being dovetailed; and the cement and hairs being pressed into the teeth

or threads, will cause them to adhere firmly to the stock or handle of the brush.

A metal ferrule may be placed on the outside of the stock of the brush if necessary, and secured by pins or rivets, or in any other convenient manner, which ferrule may also form one side of the outer groove. Fig. 18, Plate X, is a plan view of the stock of a round brush; fig. 19, is a section of the same; *a, a,* are the dovetailed grooves, which are turned out of the wood; *b,* is the metal ferrule; *c, c,* are knots, or small bundles of hair to form the brush. After a number of the knots of hair are prepared, the ends are to be dipped into proper cement, and then placed into the grooves, when their ends are to be squeezed by a pair of plyers, or other means, which will compress them into the oval shape, as shown in fig. 18, and cause the ends of the hairs to extend outward under the dovetailed part of the recess.

The knots of hair are to be successively placed in the grooves, and forced up by a tool against the last knot put in, and so on until the grooves are filled; fig. 20, is a section taken through a brush with teeth or threads of a screw formed on the sides of the groove; into these teeth or threads the cement and hairs will be forced by the compression, by which means they will be held firmly in the stock of the brush.—[*Inrolled in the Inrolment Office, April,* 1831.]

To William Wilkinson Taylor, *of Bow, in the county of Middlesex, felt manufacturer, for his invention of an improved cloth for the sails of ships and other vessels.*—[Sealed 8th November, 1832.]

This invention consists in the application of a cloth or fabric made of hair, for constructing sails for ships or other vessels. The hair used for this purpose may be of such kind as is cheapest, and commonly found in the market, as ox and cow hair, which is usually employed by mixing it with mortar for plasterer's use, the short staple hair of horses, and that of the calf, the elk, or any short staple hair that may be found useful for the purpose.

The hair is combed and carded, as in woollen manufactures in general, then taken off in slivers, and after being spun into yarn, is to be wove into cloth or fabric by means of a common hand loom, or otherwise.

The Patentee prefers that the warp threads should be made of two threads or yarns doubled or twisted together, and that the weft should also consist of two threads twisted together, that mode being the strongest, and by far the most preferable. The cloth or fabric is to be subjected to the process of fulling, as usual in woollen manufactures, which will render it a perfect material, and capable of holding the wind as well as the common sail cloth made from hemp or flax, if not much better. Sail cloth made in this manner and of this material, will not be subjected to the ill and rotting effects of mildew, damp, &c., but will perfectly resist the same.

The cloth or fabric is to be cut up and made into sails of the suitable and required shape, and the parts or pieces are to be sewn together by a thread made of similar hair to the cloth, and should also consist of two threads doubled or twisted together.

Sails made upon this improved plan will be totally free from the danger of the effects of damp, mildew, &c., which is the cause of the rotting of the sails now in use.—[*Inrolled in the Inrolment Office, May*, 1833.]

To Richard Pering, *of Exmouth, in the county of Devon, Esq., for his having invented an improvement or improvements on anchors.*—[Sealed 6th October, 1830.]

The Patentee describes the object of his present invention to be an improvement in the form of the shank and arms of anchors by increasing their strength, on the principle of increasing the dimensions in the direction of the strain to which the anchor is exposed when in use; which principle, the Patentee states, is new in its present application, whether used in constructing anchors upon the old or common plan, or when made after the manner described in the specification of his former Patent, dated the 23d day of July, 1813, to which specification he refers.

"The subject of the former Patent is described as an anchor made on new principles, which consists, first, in continuing the grain of iron from the shank into the arms, similar to the shape of a knee or arm of a tree, whereby the necessity of effecting a junction at the crown, as it is at present welded, is superseded; secondly, in carrying a piece of iron across the crown from the centre of each arm, making thereby a perfect truss, which, when welded, resembles the form of a truss beam; thirdly, in forming both the shank and arms of flat bars, placed so as to act edgeways on the line of resistance when the anchor is in the ground;

and, fourthly, in forming the largest part of the shank one third down from the crown, in a line across from toe to toe of the arms."

The Patentee proceeds to state, that his former invention applied to improvements in the construction of anchors; but his present invention is for improvements in the form of the different parts, and consists in taking away the metal for the parts where it is not wanted, and placing it when the greatest strength is required, or in such parts which are most exposed to the strain when the anchor is in use.

The greatest strain is in the direction of the plane of the arms and flukes; the greatest dimensions are therefore placed in that line. Fig. 21, Plate X, is a section taken crossways through the shank of one of these improved anchors, which will assist to explain the purport of the inventor. Fig. 22, is another section taken through the shank of an anchor constructed upon the principle of his former Patent; and fig. 23, is a similar section taken through the shank of an anchor of the old or common construction. These sections show the comparative dimensions and strength of the parts of the several anchors which are most exposed to the strain; *a, b,* is the line of the plane of the arms and flukes, consequently the line of the strain upon the anchor then in use. By this improved mode of forming anchors, the Patentee states they will be much stronger in proportion to any other anchor of the same weight, whether made upon the plan described in his former specification, or upon the old or common construction. —[*Inrolled in the Inrolment Office, April,* 1831.]

Specification drawn by the Patentee,

To JOHN SURMAN, *of Hounslow Barracks, in the county of Middlesex, lieutenant and riding-master in the Tenth Hussars, for his having invented certain improvements on bits for horses and other animals.*— [Sealed 6th July, 1830.]

THE invention described in the specification of the above Patent, consists of improvements in the curbs of bits for horses, and also of improvements in the mouth-pieces or ports of bits.

The improvements in the curbs are two distinct inventions, the first of which is described as an improvement on the "Mameluke curb," and consists in attaching that kind of curb to the cheeks of the bit by a sort of hinge joint, which will allow the curb to play a little, or accommodate itself to the motion of the bit, without coming into operation upon the horse. At the same time the extent of such motion is governed by shoulders formed on the curb, which come in contact with the cheeks of the bit when the reins of the bridle are pulled, and the curb required to be brought into operation upon the horse.

Figure 24, Plate X, is a representation of a bit, with this improvement adapted to it; *a, a,* are the cheeks of the bit; *b,* is the Mameluke curb attached to the cheek by the joints at *c, c*; *d, d,* are shoulders or projections, which come in contact with the under side of the cheeks when the reins are pulled, which will bring the curb into operation upon the jaws of the horse or other animal, and produce the same effect as the common Mameluke curb.

The second improvement upon curbs consists in attaching springs to the ends of either the common chain curb, or the Mameluke curb, for the purpose of governing the extent of pressure or action of the curb upon the horse, and

bringing the curb back into its proper place when not in operation. These springs are contained in small boxes or cases attached to the ends of the curbs, having a rod passed through them with a button on its end, which acts upon the underside of the spring; the other end of the rod is attached to the cheeks of the bit, and forms the connexion between the curbs and the bit.

Fig. 25, is a representation of this improvement, the cheeks of the bit being shown in section, better to show the parts; *a, a,* are the cheeks of the bit; *b,* is the curb; *d, d,* are boxes containing the coiled springs; *e, e,* are the rods which are fastened through a hole in the top of the boxes, and have buttons or projections upon their lower ends, which act against the underside of the springs in the box. The upper ends of the rods are connected by joints to the cheeks of the bit; when the reins of the bridle are pulled, the curb will be brought into operation, and the springs giving way, the rods will be drawn a short distance out of the boxes, and the curb elongated, whereby it will be gradually brought into full operation, instead of the full extent of power being suddenly exerted upon the horse, as in the bits of the common construction; on the reins being slackened, the springs will return the curb to its former position. The improvements in the mouth-pieces, or parts of bits, consists in making them rotatory, or turning upon pivots on their ends, which pivots are passed through holes in the cheeks of the bit, and secured by screw-nuts or collars, on their ends, or by other means, or the mouth-pieces or parts may be made to revolve upon an axle passed through them. Fig. 26, is a representation of one of the mouth-pieces, or parts which turns upon pivots, on its ends, which pivots are passed through the cheeks of the bit. Fig. 27, is a representation of another mouth-piece, to be mounted in the same way. Fig. 28, is a view of another mouth-piece, the

ends of which are formed as a hollow tube, and is intended to have a rod or axle passed through it, which axle is to be connected to the cheeks of the bit by riveting, or otherwise. —[*Inrolled in the Inrolment Office, December*, 1830.]

To Joseph Lidwell Heathorn, *of Change-alley, Cornhill, in the city of London, ship-owner, for his invention of certain improvements in rigging for ships, and other vessels.*—[Sealed 13th November, 1832.]

These improvements in rigging for ships, and other vessels, consist in adapting elastic appendages to chains, employed for the shrouds or standing rigging in place of ropes. These elastic appendages may be variously constructed; they may be made of metallic or wooden springs, or of any other elastic material, and are to be applied in any convenient way to the standing rigging, for the purpose of relieving the chains from sudden strain or pressure, by affording a certain degree of elasticity, and yet retaining the rigging with a sufficient degree of tension. The way in which the Patentee proposes to apply these elastic appendages, and the manner of constructing them, are exhibited in the several figures in Plate X. Figs. 29, and 30, represent portions of the side of a vessel, with standing chain shrouds, and showing the manner of applying the springs, which are of various kinds. Those of fig. 29, are metallic springs of different constructions; those of fig. 30, are made of wood. Figs. 31, and 32, are different views of a spring which contracts, shown adapted to the rigging at *a, a, a,* in fig. 29. Figs. 33, and 34, represent another mode of applying a contracting spring, shown adapted at *b, b,* in fig. 29; and fig. 35, an expanding spring, shown at *c, c,* in fig. 29.

The mode of making these springs is so well known, that it will be unnecessary to describe them more minutely, and the manner in which they are attached to the shrouds will be obvious from the drawing fig. 29; fig. 36, represents a wooden spring, formed by two rails connected by a clamp round the middle. These are the kind of springs adapted to the shrouds in fig. 30. The Patentee states, in conclusion, that it is only necessary to add, that in order to prevent accidents from the springs breaking, it would be desirable to allow a slack part of the chain to be continued as a preventer, and that he does not confine himself to these particular constructions of springs, nor to the precise way in which they are represented as attached to the shrouds, but claims every construction of spring, and every mode of adapting them, which may be applicable to the purpose of affording elasticity to chain-rigging of ships, or other vessels.—[*Inrolled in the Rolls Chapel Office, May,* 1833.]

Specification drawn by Messrs. Newton & Berry.

To William Gratrix, *of Salford, in the county of Lancaster, silk dyer, for his invention of an improved method of imparting to various woven fabrics, or to the yarns or threads of which the same are intended to be composed, the colour necessary to form the required patterns thereon.*—[Sealed 5th January, 1833.]

The invention described under this Patent, is for a new method of applying the colour to piece-goods in general, and is effected by the following means: the pattern with which the goods are intended to be wrought, is first cut out of a thin sheet of copper, tin, or other metal, or mixture

of metals, or it may be cut out of a square of silk, stout paper, or any material which is suited to the purpose, but which must first be rendered impermeable to the colour by oils, varnish, &c.; the sheet, with the pattern cut out of it, is then to be mounted on one side of a frame, and the flat side of the frame and sheet placed upon the silk, or other piece-goods to be wrought with the intended patterns, which goods must be previously stretched upon a plane or table fit to receive them; the colour is then rubbed over the whole surface of the sheet of metal containing the pattern, with a brush or otherwise (in the manner of stencilling), or the colour may be communicated through the medium of a felt absorbed with colour, and subjected to a slight pressure, such as the blow of a hammer, or a gentle pressure in any other way. This process will leave the pattern only upon the goods, the intervening surfaces of the sheet preventing the colour from marking any part of the goods, but those exposed by the removal of part of the sheet of metal, in cutting out the pattern.

It must be quite evident that this process is the mere adaptation of the art called "stencilling," to piece-goods; which process has been adopted generally for many years, as a cheap mode of covering walls of rooms with patterns, to supersede paper hanging. It is also evident that this process would produce much the same effect as block printing in common, as many colours may be worked upon the same ground by the intervention of surfaces, containing different patterns cut therein, to suit the different colours and shades, required for the completion of the pattern upon the piece-goods.—*Inrolled in the Inrolment Office, July, 1833.*]

To JOSIAH JOHN GUEST, *of Dowlais Iron Works, Merthyr Tydvil, in the county of Glamorgan, Esq. for an improvement in the process used for producing from iron ore, and other materials containing iron, what is called in the iron trade "finers."*—[Sealed 31st January, 1833.]

THE claim of this Patent is for an improved manufacture of what is termed "finer's metal," immediately from the blast furnace, instead of casting it into pigs, and allowing it to cool as usual, in the manufacture of iron from ore, or other substances containing iron. The Patentee states, that he places his refinery as near to the blast furnace as possible; and the top of the refinery must be under the level of the tap hole of the blast furnace, from whence an iron shute or channel protrudes; and on the furnace being tapped, the fluid iron will flow immediately into the refinery, to be converted into finer's metal, instead of being cast into pigs, and allowed to cool as heretofore.—[*Inrolled in the Inrolment Office, May,* 1833.]

To JOHN WARNER, *the younger, of the Crescent, Jewin-street, in the city of London, brass-founder, for his invention of certain improved processes in giving a metallic coating to various articles of commerce.*—[Sealed 24th January, 1833.]

THE object of this invention is the covering of all leaden articles of commerce, such as tubes, pipes, cylinders, &c., with a thin wash or coating of tin, or with an alloy of tin, and is described by the Patentee nearly as follows:—

A bath of melted tin, or alloy of tin, is prepared, and heated to that degree of heat which would exactly supersede the fusion of lead, so that the article to be tinned shall not be materially injured during the submersion of the same in the bath of melted tin: when all parts of the tube, &c., are to receive the coating, the whole is to be covered or sprinkled over with powdered rosin, or a mixture of rosin and oil boiled together, and the same mixture is to be blown through the interior when the article is either tubular or cylindrical, so that all parts which are intended to receive the coating shall be covered with rosin.

The articles are then to be submersed or drawn through the bath of melted tin, or alloy of tin, when they will receive a perfect coating of the same; but when only parts or portions of the article is to be tinned, then an admixture of lamp black and size, or any other such article as will resist the adhesion of the melted tin, or alloy, is prepared; and the parts not to be covered with the coating of tin, are washed over with it; and the other parts which are to receive the tin, are covered with rosin, as before, and submitted to the bath in the same manner.

When light articles only are to be tinned, it may in common be done by the hand, but for heavier goods it will be found necessary to suspend the same by ropes from pulleys, or by some such mechanical contrivance, which may be easily adapted to facilitate the submersion in the bath.

It will be evident that all articles submitted to this process, will resist in every way the desultory effects of corrosion, and pipes prepared in this manner will be found particularly useful as conducting pipes for beer engines, &c.; and this improved mode of coating is particularly applicable to articles intended to contain those acids which are known to produce deleterious effects by their contact with lead in general.

It is only necessary to remark, that the bath of tin must be kept under a layer of oil, fat, or other unctuous material, to prevent oxydation, and which will be very beneficial in aiding the process of tinning.—[*Inrolled in the Inrolment Office, July, 1833.*]

To George Goodlet, *of Leith, proprietor of the London, Leith, and Edinburgh Steam Mills, for his invention of a new method of preparing rough meal from ground wheat and other grain, previous to their being dressed for flour; also rough meal from ground barley, or other grain, previous to their being put into the mash tub for brewing or distilling.*—[Sealed 3rd May, 1832.]

The process described under this Patent is the application of artificial heat to rough meal, produced from ground wheat and other grain previous to its being dressed for flour, by which means it is enabled to be submitted to a much finer engine; and also, enabling the miller to use the produce of a fresh crop almost immediately after harvest, and producing flour equal to that obtained from old wheat newly thrashed, and prevents the necessary admixture of old wheat with new, which is generally practised to facilitate the dressing of the flour.

By the application of this improved process, the new crop is rendered fit for the dressing engine in the course of a few hours, without the expense heretofore attending the same process. The Patentee states, that he has hitherto applied the necessary artificial heat in the following manner: first, by spreading a layer of rough meal six or eight inches thick upon a linen bed, and placing the same in a kiln properly heated by steam; the grain is to be turned over as

discretion may advise, and after remaining ten or fifteen hours, the meal may be removed out of the kiln to cool; after which it will immediately be ready to be dressed for flour, and is said to produce bread of a much better flavour, and a saving of about fifteen minutes in baking; the bread is also said to keep better, and be much more palatable to the consumer, and that a greater number of loaves of bread may be produced from a sack of flour than heretofore, and of much superior quality than ordinary.

Rough meal, from ground barley and other grain, is to be subjected to exactly the same process, previous to its being put into the mash tub for brewing or distillation.—[*Inrolled in the Inrolment Office, December*, 1832.]

To Frederick Muntz, *of Birmingham, metal roller, for his invention of an improved manufacture of metal plates for sheathing the bottoms of ships, and other such vessels.*—[Sealed 22nd October, 1832.]

The object of this invention is the manufacture of plates for the sheathing of ships' bottoms, from an alloy of copper and zinc, in the proportions of about 60 per cent. of copper to 40 per cent. of zinc, which alloy will work and roll at a red heat; but great care must be taken that the heat is not sufficient to cause the fusion of either metal. This mode of manufacturing plates for the sheathing of ships' bottoms is stated to be much cheaper than the common method, owing to the manufacture being so much easier, and much more suitable to the purpose, as these improved plates are not so liable to oxydation, and are therefore much more durable; but the plates manufactured by the Patentee oxydate sufficiently to keep the bottom of the vessel quite clean.

After the plates are rolled, they must be annealed, and then washed in a solution of sulphuric acid and water, to clean them, and afterwards put up to dry, when they will be fit for use.

It may be suggested, that an alloy may also be made in the same manner from calamine and copper, or brass and zinc, or many other admixtures of metals, but any of which alloys will be much more expensive, less durable, and, consequently, much less suitable to the sheathing of ships' bottoms.

The Patentee, therefore, not only claims the alloy from copper and zinc in the particular quantities and portions set forth in the specification, but also all kinds of alloyed metals which will roll together, and are thereby well adapted to the sheathing of ships' bottoms, their being much easier in manufacture, and less subject to oxydation than the common sheathing.

The alloys described in this specification seem to be the same as described in the specification of Mr. Muntz's former Patent for ships' bolts and other fastenings, (for a description of which see p. 83, of the present volume).—[*Inrolled in the Inrolment Office, April,* 1833.]

To William Herbert, *of Nottingham Park, in the county of Nottingham, lace-manufacturer, for his invention of certain improvements applicable to that class of machinery commonly called or known by the name of warp machinery, employed for the manufacture of lace and other fabrics.*—[Sealed 21st March, 1833.]

These improvements apply to that peculiar principle or construction of machinery commonly called or known by

the name of the warp lace machine, and consist in the means of actuating or working such machinery by steam, water, or other rotatory power.

The Patentee describes his invention as follows:—

The particular construction and mode of working the warp lace machinery is so well known by the trade, that a detailed description of its parts and operations are unnecessary; I have therefore, in the accompanying drawings, merely exhibited the general features of the warp lace machine, for the purpose of showing a convenient manner of adapting my improvements thereto, and the objects of their several parts in connexion with that construction of machinery.

Fig. 1, Plate XI, represents a front view, taken geometrically, of the complete machine, as it would appear in working order. Fig. 2, is a back view of the same, in which most of the improved parts are seen, as adapted to the original machine. Fig. 3, is a transverse section, taken vertically through the machine near the middle; and the following figures represent the operative parts of the improved mechanism in detached views, taken transversely through the machine in the same direction as fig. 3.

The actuating parts of the mechanism are all mounted upon a rotatory shaft, extending horizontally along the back of the machine, which is driven by toothed gear through the agency of a rigger, drum, or pulley and band, leading from any first mover.

The new parts seen in the back view, fig. 2, may be described generally under the following heads: A, A, being the main shaft whereon all the actuating parts are mounted, which is driven by a rigger B, and toothed gearing C, D, with a clutch box for throwing the machine in and out of action. The main shaft being thus made to revolve: E, is the segment rack, pinion, tappet and crank, by which at intervals the

up and down vibratory movements of the guide bars, are effected through the agency of jointed rods below, as shown more particularly in fig. 4; F, are the cams for moving the guide bars in and out (that is, to and fro) by means of a sliding bar attached to the guide bar carriage, as represented in fig. 5. These movements of the guides are for the purpose of laying the threads over the shafts of the needles, and drawing their loops under the beards; G, is the alternating tappet, with a cam above, attached to the tail pole of the presser bar, by which the presser bar in front is forced down upon the beards of the needles which hold the loops of the work; H, is a vertical lever, on the upper end of which a pin or arm, extending from the side of the tail pole of the sinker bar, rests for the purpose of keeping the bar, with the sinkers in front, depressed, while the machine throws the threads over the needles.

As the main shaft goes round, a cam forces this lever H, out of its perpendicular position, when the pin or arm slips off, and allows the tail pole to fall, which causes the sinkers in front to be elevated. This will be best seen in the section of the whole machine at fig. 3; I, is the cam and friction roller connected with the swinging rods, called the back tackle, for knocking over, by which the sinker bar is advanced for the purpose of sending forward the work previously formed on the needles. This will be perceived by the detached figure 6; K, is the rotatory tappet and the cam, affixed to the tail pole of the sinker bar, by the elevation of which the sinker bar becomes depressed. This will also be seen in the section, fig. 3; L, is the cam acting on the other tappet of the swinging rods of the back tackle for driving the sinker frame back in opposition to I, shown also in the detached figure 6; M, and O, are the continuous rotatory wheels fixed at the ends of the main shaft, with tappets on their faces, which act upon levers carrying the

clicks that drive the ratchets on the fancy wheels, or Dawson's wheels, one of which is represented in the detached figure 7.

Having thus pointed out generally the several contrivances by which I actuate the operative parts of a warp lace machine by rotatory power, in place of manual labour, I shall proceed to describe more particularly the details of each movement, the object being well understood by workmen in that branch of business.

The segment rack E, seen in profile at fig. 4, is formed by a wheel fixed on the main shaft, a segment or portion of the periphery of which only has teeth. A pinion *a*, turning upon a stud fixed in the end frame of the machine, is placed coincident with the wheel E, in order that the teeth of the segment, as the wheel revolves, may at intervals drive the pinion round; and in order that the teeth of the pinion and the rack may come accurately into gear, a tappet *b*, on the face of the wheel, strikes as it goes round upon a wiper *c*, extending from the side of the pinion, and causes the teeth of both to take into each other. A rod *d*, is attached to the side of the pinion by an excentric pin or crank, and the reverse extremity of the rod is jointed to a lever *e*, at bottom, which vibrates upon a fulcrum pin in the centre. A parallel rod *f*, is also connected by a joint to the opposite end of the lever at bottom, and at top to the front of the guide bar carriage *g*, Hence it will be seen that as often as the pinion *a*, is made to revolve, the guide bars will receive a tilting vibratory movement, which, as before said, is for the purpose of enabling the guides to lay their threads over the shafts of the needles. Fig. 5, represents the mechanism for moving the bar and carriage *g*, with the guides, to and fro upon its vibrating arms *h*. The cam F, is fixed upon the main shaft, as shown in the back view, fig. 2; and in revolving, presses against the roller at the

top of the small rocking lever *i*. This lever vibrates upon a fulcrum pin passed through its centre, which is fixed in the end frame of the machine. The lower end of the rocking lever is jointed to the back extremity of the sliding bar *k*, the opposite end of the sliding bar being attached by a joint to the vibrating arm *h*, of the guide bar carriage. Hence it will be perceived, that when the cam F, acts against the roller at the top of the rocking lever *i*, the guide bars, with the guides, will be driven forward away from the needles, which brings the loops of the threads under the beards of the needles. The alternating tappet G, (see fig. 2), is intended to come into operation only once in two rotations of the main shaft; its object is to raise the tail pole of the presser bar, when the presser bar is required to be brought down upon the beards of the needles. The boss of the tappet is seen slidden back, and as it revolves, passes free from the cam; but a toothed pinion *l*, fixed on the main shaft, turns the wheel *m*, (of twice its diameter), and at every second rotation brings an inclined plane *o*, against the end of the tappet shaft, which causes it to slide laterally. The boss of the tappet being by these means brought immediately under the cam *p*, the rotation of the tappet now raises the tail pole, and brings the presser bar *q*, in front down on to the beards of the needles (see fig. 3.) On the next rotation of the tappet, an inclined plane, on the side of the cam *p*, strikes against the boss, and slides the tappet back again away from the cam, so as to place the tappet out of operation until it is brought in again at the second rotation by the inclined plane *o*, as before.

The tappet K, fixed upon the main shaft, in revolving, passes under the cam *r*, attached to the tail pole of the sinker bar, and raises that tail pole, which consequently depresses the sinkers *s*, in front (see fig. 3.) When that

tail pole is thus elevated, the vertical lever H, is, by the power of a spring *t*, brought into a perpendicular position, as shown by dots in the last mentioned figure; and on the tappet K, leaving the cam *r*, the arm or pin *t*, near the end of the tail pole, falls on to the top of the vertical lever, and rests there. The sinkers *s*, by these means, remain depressed, keeping the work back, while the guides lap the threads over the needles for the next series of stitches; but at the precise time when the sinkers are required to rise, a cam *u*, fixed on the main shaft, comes round, and, by pressing against a roller *v*, on the side of the vertical lever, forces that lever out into the inclined position; and, by the pin *t*, slipping off the top of the lever, the tail pole is allowed to fall, and consequently, the sinker bar, with the sinkers *s*, immediately rises. The sinkers are advanced for the purpose of taking forward the work, by the cam I, fixed on the main shaft, through the means of the mechanism shown at fig. 6. As the cam I, revolves its larger radius at the desired time, it acts against the friction roller *w*, mounted in an arm extending from the sliding rod *x*, of the back tackle *y*; and the sinker bar, which is attached to the sliding rod in front, carries the sinkers *s*, by these means forward. When it is required to make the sinkers recede, a similar cam L, (see fig. 2,) also fixed upon the main shaft, also acts against a similar friction roller *z*, mounted in an arm extending from a corresponding sliding rod *x*, of the back tackle *y*, which brings the sinkers back again. This will also be perceived by reference to fig. 6.

The mode of giving the pattern to the work by means of the fancy wheels, or Dawson's wheels, placed at the ends of the machine, is fully understood by workmen in the trade. I have therefore only to say, that tappets are placed upon the sides of the wheels O, and M, which, as the main shaft goes round, act upon levers N, N, and thereby give the up

and down movements to the clicks o, o, by which the ratchets on the barrels of the Dawson's wheels are driven round, as shown in fig. 7. [*Inrolled in the Rolls Chapel Office, September*, 1833.]

Specification drawn by Messrs. Newton & Berry.

Literary and Scientific Miscellanea.

Pressure of the Ocean.

In those accustomed to the Greenland whale fishery, the immense pressure of the ocean cannot but have excited much astonishment and curiosity. In the common method of capturing whales, it is customary to strike them, at first, by a harpoon, an instrument well known to the sailors, with a stock or handle of fir, ash, or hickory, with a line of a very considerable length attached to it; and as soon as struck, the whale generally descends, nearly as quick as a bird, to a very great depth, taking the harpoon along with him, buried to the depth of twelve or eighteen inches in his body, while the other end of the line is particularly coiled in the boat, and veered out by the harpooner with much caution and dexterity. It sometimes happens that the whole of the first boat's line, though no less than 1080 fathoms long, will be taken under water in a very few minutes; and if another boat be not near for the harpooner to fasten the end of another line to the end of his own, the whale must be suffered either to go away with the line, or else with both boat and line; the latter method can only be taken when a convenient piece of ice is at hand for the preservation of the boat's crew. And it has too frequently happened, that the line has got entangled in the boat, in consequence of which the whale has taken it completely under water along with her, and given the whole, or most of

the crew, a watery grave. During my career I have twice experienced this misfortune, having had the boat taken twice from under my feet, and at another time a whale cut my boat completely in two with his tail. During the absence of the whale under water, many boats are collected around, waiting his return to the surface, when he is immediately struck by another, or perhaps two harpoons, and then descends again the same as before, but probably not a tenth part so far as at first, ere he is obliged to return again to the surface to breathe. He is then struck with lances, instruments with a blade and shank from four to six feet long, which are thrust to the same distance into his body, and which makes the blood spout out in torrents. One or two good lances, directed to proper parts of the body, speedily put an end to his existence, when he immediately turns on his back, and lies flat on the surface of the water.

It had long occurred to me, that when the harpoons were taken out of the new killed whales, they were much heavier than usual; and that they were obliged to be hung up in the galley (the place for cooking) before a large fire for several days, before they could, at any rate, be made use of again; nor were they, after this long exposure to heat, near so light and handy as at first. This had frequently attracted my notice, without any further investigation of its cause, until the year 1820, on board the ship Harmony, of Whitby, when, after capturing a whale in the usual manner, I observed a harpoon-stock, which was broken close to the socket, and which I believe was of fir, drop into the water, and immediately sunk like a stone. This excited my curiosity afresh, and I determined to examine more minutely the several harpoon-stocks which had been taken down by whales to similar depths; and on cutting them in two with a saw, I found that of whatever kind of wood they were made, they were as completely soaked in every pore, to the very heart, as if they had lain at the

bottom of the sea since the creation of all things! and even some of them were cracked and fissured in different places. Beside, their surfaces were invariably covered with small air bubbles like froth, for a considerable time after they were risen above the surface of the sea.

I also corked and sealed an empty quart bottle, and sent it down with the marine diver, to the depth of 100 fathoms; and when drawn up, the cork was found in the inside of the bottle. I then made another cork, rather too large for the bottle, knocked it in with a mallet as far as I could, for fear of breaking the bottle, which, being sent down to the depth of 100 fathoms, was found to be pushed in; and it is very probable that had the cork been sufficient to resist the pressure, the bottle would have been crushed to atoms. However surprising this may appear, it must necessarily vanish, when we consider the immense pressure which must of necessity take place on every part of the surface of the body immersed under such a vast column of water: such a pressure as no vacuities, however strongly protected, can resist. For the pressure on the bottle, consisting of only 85.215 square inches of surface, at the depth of 100 fathoms, is found by calculation to be no less than 10 tons, 9 cwt. 1 qr. 13 lb., and that on the cork 15 stone, 6 lb. 2 oz. And at the depth of 900 fathoms, or 5400 feet, the pressure on every square foot of surface will be $(5400+34)\ 1000\,\text{oz.}=5434000\,\text{oz.}=151$ tons, 12 cwt. 1 qr. 13 lb.!!—*Nautical Magazine.*

THOS. BEVERLY.

The Iron Steam-Boat Alburkha.

THIS vessel is now in the river Niger, with the Quorra steam-boat, and seems to have been the favourite of the two vessels since they departed on their interesting expedition. The advantages of iron vessels in warm climates,

are ably pointed out in a short extract we gave in our last number from Chambers' Journal; and these advantages seem to be in no wise exaggerated in the instance of the Alburkha, according to the reports received from those embarked in her. This vessel was built by Mr. Laird, of Liverpool, for the purpose of navigating the shoal-water of the river, and we understand that he has since constructed another for the interior navigation of Ireland. We have little doubt that these vessels, from their vast superiority over those of wood, and their durable quality, will speedily be numerously employed.—*Ibid.*

Remains uncovered by the Sea at La Hogue, France.

A Singular circumstance happened at La Hogue on Saturday the 7th of March, 1833. The weather being very calm, and the surface of the sea smooth, the tide was observed to ebb to so great a distance, as to leave the road-stead entirely dry. Part of the vessels of the celebrated Tourville,* that were burnt and sunk by the English fleet under Admiral Russel, May 29th, 1692, were exposed to view. The hulls of these ships appeared in a high state of preservation, and, during the interval of the two tides, it was found practicable to recover six pieces of cannon, and several eart-loads of cannon-shot. These, although they

*History informs us, that twelve of Tourville's vessels were destroyed in La Hogue Roads, and that many others met with the same fate on the coast of Cherbourgh. Not many years since, some curious relics were discovered buried a few feet in the sand; among them were a quantity of cannon-shot, and the scabbard of a sabre: this occurred in the Downs, towards the east of the port, and the articles found were supposed to have belonged to these unfortunate vessels. The old sailors affirm, that on many occasions, at the reflux of the tides, they have seen other pieces of wreck lying several fathoms under water.

had remained under water for upwards of 141 years, were found in good condition. Since this brilliant, but unfortunate battle, there is no tradition of the sea having receded so far as in the above-mentioned instance. The mariners of the coast foretell a similar event to occur on Friday, the 5th of April. It is to be hoped that the expectation of such a phenomenon being repeated, will suggest some more effectual measures to be adopted for the recovery of these remains of wreck than could be employed at the time, from the suddenness and surprise occasioned by so unexpected an event.—*Annales Maritimes.*

We could not find room for the foregoing in our last,—and in the Numbers V. and VI. of the *Annales*, which have since come to hand, we find that instead of six pieces of cannon, one only was recovered; and 150 shot, of various sizes. Forty or fifty of these were got into an old boat, which was overturned by the sea, and endangered the lives of two of the *salvors*, who were inexperienced in nautical affairs. The boat having sunk on a part of the coast belonging to the Port of St. Vaast, no further trouble was taken about her or her cargo!—*Nautical Magazine.*

New Patents

SEALED IN ENGLAND.

1833.

To Henry Davey, of the parish of Saint Giles's, Camberwell, in the county of Surrey, gentleman, for certain improvements in machinery or apparatus for preparing linen and cotton rags, and other materials used in the manufacture of paper, being a communication from a foreigner

residing abroad.—Sealed 28th September—6 months for inrolment.

To Andrew Smith, of Princes-street, Leicester-square, in the parish of Saint Martin's-in-the-fields, in the county of Middlesex, machinist, for his invention of certain improvements in springs for doors, and other purposes.—Sealed 5th October—6 months for inrolment.

To James Windeyer Lewty, of Lichfield-street, in Birmingham, in the county of Warwick, brass-founder, for his invention of certain improvements in castors.—Sealed 5th October—6 months for inrolment.

To Miles Berry, of 66, Chancery-lane, in the county of Middlesex, civil engineer, for his invention of certain improvements in the construction of weighing machines, being a communication from a foreigner residing abroad. —Sealed 5th October—6 months for inrolment.

To Thomas Welch, of Manchester, in the county of Lancaster, cotton spinner, for his invention of a new method of taking up, for power and hand looms.—Sealed 5th October—6 months for inrolment.

To William Tanner Young, of Liverpool, in the county of Lancaster, merchant, for his invention of a machine or apparatus for equalizing draft, chiefly applicable to the towing of barges, and other floating bodies on water, and moving or drawing carriages on land.—Sealed 7th October —6 months for inrolment.

To Joseph Maudsley, of Lambeth, in the county of Surrey, engineer, for his invention of an improvement in the structure of certain boilers for producing steam for the working of steam engines.—Sealed 7th October—6 months for inrolment.

To Goldsworthy Gurney, of Bude, Cornwall, Esq., for

his invention of certain improvements in musical instruments.—Sealed 7th October—6 months for inrolment.

To Robert Stephenson, of Newcastle-upon-Tyne, in the county of Northumberland, engineer, for his invention of a certain improvement in the locomotive steam engines now in use, for the quick conveyance of passengers and goods upon edge railways.—Sealed 7th October — 6 months for inrolment.

To Robert Burton Cooper, of Battersea Fields, in the county of Surrey, Esq., and George Frederick Eckstein, of Holborn, in the county of Middlesex, iron monger, for their invention of an instrument or apparatus for pointing pencils, and certain other purposes.—Sealed 12th October—6 months for inrolment.

To Stephen Hutchinson, of 12, Pall Mall East, in the parish of Saint Martin's-in-the-fields, in the county of Middlesex, for his invention of certain improvements in machinery or apparatus for manufacturing gas for illumination, and in the mode or means of supplying gas to the consumer, and also in the construction of gas burners; parts of which improvements are applicable to other useful purposes.—Sealed 12th October—6 months for inrolment.

To Richard Barnes, of Wigan, in the county of Lancaster, engineer, for his invention of a certain machine or apparatus for producing, by the combustion of gas or oil, heated air for warming the interior of buildings; and which machine and apparatus may be applied at the same time to give light.—Sealed 19th October—6 months for inrolment.

To John Tennant, merchant, and Thomas Clarke, chemist, both of Glasgow, in the county of Lanark, for their invention of a new or improved apparatus, to produce or evolve chlorine, for manufacturing purposes.—Sealed 19th October—6 months for inrolment.

To Jacque Francois Victor Gerard, of Redmond-row, Mile End, in the county of Middlesex, for an improvement applicable to the Jacquard looms, for weaving figured fabrics, being a communication from a foreigner residing abroad.—Sealed 19th October—6 months for inrolment.

To Charles Attwood, of Wickham, near Gateshead, in the county of Durham, glass manufacturer, for his invention of a certain improvement or improvements in manufacturing or purifying soda.—Sealed 19th October—6 months for inrolment.

To Thomas Augustus Gregory Gillyon, of Crown-street, Finsbury-square, in the county of Middlesex, engineer, for his invention of improvements on ordnance, and on the carriages and projectiles to be used therewith.—Sealed 19th October—6 months for inrolment.

To Herman Hendriks, of Dunkirk, in the kingdom of France, but now of the Strand, in the county of Middlesex, gentleman, for certain improvements in manufacturing prussiate of potash, and the prussiate of soda, and improvements in dying blue colours without Indigo, being a communication from a foreigner residing abroad.—Sealed 19th October—6 months for inrolment.

To John Joyce, of South-row, New-road, Saint Pancras, in the county of Middlesex, gentleman, for a certain improvement or improvements in machinery for making nails, being a communication from a foreigner residing abroad.—Sealed 19th October—6 months for inrolment.

NEWTON and BERRY,
Patent Office, 66, Chancery Lane.

CELESTIAL PHENOMENA, FOR NOVEMBER, 1833.

D.	H.	M.	
1	0	0	Clock after the ☉ 16 m. 15 s.
	—		☉ rises 6h. 55m. sets 4h. 32m.
	—		☽ rises 7h.7m.P.M. sets 10h. 45 m. A.M.
	—		☽ passes the mer. 15 h. 45 m.
	7	0	☉ in conj. with ♂
3	15	21	♃'s first sat. will emerge.
5	0	0	Clock after the Sun 16 m. 14 s.
	—		☉ rises 7h. 2m. sets 4h. 25 m.
	—		☽ rises 11 h. 33 m. P.M. sets 2 h. 9 m. P.M.
	—		☽ passes the mer. 19 h. 31 m.
	—		Mer. R. A. 15 h. 59 m. dec. 22. 48. S.
	—		Ven. R. A. 12 h. 53 m. dec. 3. 51. S.
	—		Mars R. A. 14 h. 37 m. dec. 15 13. S.
	—		Jup. R. A. 1 h. 50 m. dec. 9. 42. N.
	—		Sat. R. A. 12 h. 26 m. dec. 0. 28. S.
	—		Georg. R. A. 21 h. 25 m dec. 15. 56. S.
	—		Vesta R. A. 19 h. 57 m. dec. 25. 4. S.
	—		Juno R. A. 16 h. 21 m. dec. 11. 14. S.
	—		Pallas R. A. 8 h. 34 m. dec. 18. 56. S.
	—		Ceres R. A. 9 h. 55 m. dec. 20. 9. N.
		50	☽ in ☐ or last quarter.
	9	50	♃'s first sat. will emerge.
8	7	23	☽ in conj. with ♄ long. 5. in Libra ☽ lat. 5. 4. N. Sat. lat. 2. 6. N. diff. of lat. 2. 59.
	8	0	☽ in Perige.
9	3	29	☽ in conj. with ♀ long. 18. in Libra. ☽ lat. 5. 4 N. ♀ lat. 1. 42. N. diff. of lat. 4. 22.
10	19	0	☉ in ☐ with ♅
10	0	0	Clock after the Sun 15m. 54s.
	—		☉ rises 7h. 11m. sets 4h. 16m.
	—		☽ rises 5 h. 5 m. A.M. sets 4 h. 9. m. P.M.
	—		☽ passes the mer. 23 h. 52 m.
11	0	21	☽ in conj. with ♂ long. 15 in Scorpio. ☽ lat. 4. N. ♂ lat. 0. 5. N. diff. of lat. 3. 55.
	5	54	Ecliptic conj. or ● new moon.
12	2	48	☽ in conj. with ☿ long. 1. in Sagitt. ☽ lat. 3. 0 N. ☿ lat. 2. 31. S. diff. of lat. 5. 31.
12	11	45	Jupiter's first sat. will em.
14	6	14	Jupiter's first sat. will emerge.
15	0	0	Clock after the ☉ 15 m. 11 s.
	—		☉ rises 7 h. 20 m. sets 4 h. 9 m.
	—		☽ rises 11 h. 19 m. A.M. sets 7 h. 8 m. P.M
	—		☽ passes the mer. 3h. 8 m.
	—		Mer. R. A. 16 h. 51 m. dec. 25. 7. S.
	—		Ven. R. A. 13 h. 39 m. dec. 8. 30. S.
	—		Mars R. A. 12 h. 28 m. dec. 2. 22. S.
	—		Jup. R. A. 1 h. 45. dec. 9 18, N.
	—		Sat. R. A 12 h. 30 m. dec. 0 51. S.
	—		Georg R. A. 21 h. 26 m. dec. 15 54. S.
	—		Vesta R. A. 21 h. 14 m. dec. 24. 18. S.
	—		Juno R. A. 16 h. 34 m. dec 11. 49. S
	—		Pallas R. A. 8 h. 46 m. dec. 20. 56. S.
	—		Ceres R. A. 10 h. 7 m. dec.
	—		19 50. N.
19	0	0	♂ in South node.
	—		☿ elong. max. E. 22. 6.
	8	3	☽ in ☐ or first quarter.
	13	40	Jupiter's first sat. will emerge
20	0	0	Clock after the ☉ 14 m. 9 s.
	—		☉ rises 7 h. 28 m. sets 4h. 3m.
	—		☽ rises 2 h. 4 m. P.M. sets 12 h. P.M.
	—		☽ passes the mer. 7 h. 5 m.
20	0	0	☽ in Apoge.
21	8	9	Jupiter's first sat. will emerge.
22	0	4	☉ enters Sagittarius.
23	19	58	☽ in conj. with ♃ long. 24. in Aries. ☽ lat. 4. 45. S. Jup. lat. 1. 26. S. diff. of lat. 3. 19.
25	0	0	Clock after the Sun 12 m. 46 s.
	—		Sun rises 7h. 36m. sets 3h. 58m.
	—		☽ rises 3 h. 32 m. P. M. sets 5 h. 2 m. A. M.
	—		☽ passes the mer. 10 h. 58 m.
27	7	20	Ecliptic oppos. or ○ fullmoon.
28	10	5	Jupiter's first sat. will emerge.
29	0	0	☿ Stationary.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR SEPTEMBER AND OCTOBER, 1833.

1833.	Thermo.		Barometer.		Rain in inches-	1833.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low.			Hig.	Low	Hig.	Low.	
Sept.						Oct.					
26	65	44	29,74	29,72		11	55	33	30,09	30,08	
27	62	41	29,60	29,51		12	50	32	29,98	21,96	
28	63	39	29,68	29,57		13	51	30	30,07	30,01	,1
29	63	37	29,97	29,77	,05	14	59	40	29,57	29,40	,2
30	62	34	30,07	30,02		15	55	43	29,27	29,04	,45
Oct. 1	61	33	30,13	30,11		16	55	39	29,31	29,16	,2
2	59	33	30,15	30,06		17	56	38	29,57	29,48	,125
3	60	35	30,01	Staty.		18	58	37	29,65	29,60	
4	61	35	30,06.	30,03		19	52	38	29,47	29,43	,05
5	59	37	30,07	30,04		20	49	27	29,49	29,46	
6	60	36	30,05	30,02		21	57	37	28,49	29,38	,025
7	60	34	30,04	33,01		22	57	39	29,62	29,56	,15
8	59	39	29,96	Staty.		23	61	39	29,57	29,45	,675
9	58	37	30,12	30,05		24	60	39	29,63	29,45	
10	58	35	30,16	30,13		25	60	44	29,43	29,39	

Aurora Borealis—From half-past six on the evening of the 12th, till after midnight, the northern hemisphere was remakably illumined to the height of 40°; about a quarter to seven, a large coruscation arose in a direction from N.E. to S.W. to within about 20° of the Zenith; it then became detached from the horizon, and moved across the heavens, like a cloud strongly illumined by the setting sun, till seven, by which time about 60° of its length had dissappeared in the S.W. horizon; from this time it increased greatly in breadth and brilliancy, and at half-past seven moved towards the place from whence it rose, till its length exceeded 90°, and so continued till nearly eight, gradually becoming fainter, till about half-past eight it disappeared. Several smaller ones were seen during the interval, moving from the north towards the Zenith.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 61 West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES,

AND

REPERTORY

OF

PATENT INVENTIONS.

No. XX.

CONJOINED SERIES.

Recent Patents.

To ARCHIBALD DOUGLAS, *of Manchester, in the county palatine of Lancaster, manufacturer, for his invention of certain improvements on power looms, and the shuttles used therein.*—[Sealed 30th April, 1833.]

"MY invention consists of an improved shuttle and appendages, the mechanism of which is so contrived and arranged that on the breaking of the material called the 'weft' or 'shute,' the working of the loom is stopped, in order that the necessary adjustments may be made; an apparatus to be connected with the batten of a loom, by means of which the action of springs attached to the swords of the batten is regulated, and adapted to the

production of different figures, as a solid stripe or cord across the work; and of an improved apparatus for regulating the taking up motions of a loom, and the number of pricks in an inch; which improvements may be used together in the same loom, or separately, as the nature of the work may be deemed to require.

"And I do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, is described and ascertained in the following explanation, illustrated by the accompanying drawings, wherein the same parts in the different figures are uniformly denoted by the same letters of the alphabet.

"Plate XII., fig. 1, is a plan of one of my improved shuttles; fig. 2, is a longitudinal section of the same; fig. 3, is a transverse section thereof: *a, a,* is the body of the shuttle; *b,* the cop or bobbin; *c, c,* are spring clams, between which the weft is drawn previous to being passed through the loop or crank in bolt: *d, d,* is a bolt with a loop or crank, through which the weft is passed after being drawn through the clams *c, c; e,* is a socket inserted into the front of the shuttle for the reception of the corresponding end of the bolt *d; f, f,* are wire guides limiting the circular motion of the bolt; *g,* is a metal plate fastened to the side of the aperture in the body of the shuttle; *h,* is a spring, one end of it attached to the plate *g,* the other end passing through a hole in the bolt.

"There is a groove or cavity peculiar to my shuttles, which is distinctly shown at *i,* in fig. 3; *k,* is a strong metal staple or sheath inserted into the groove or cavity *i.*

"Figs. 4 and 5, represent a lock adapted to the left hand side of the batten of the loom; and figs. 6 and 7, represent a lock adapted to the right hand side of a batten, the respective parts in figs. 4 and 6, being exhibited in positions for locking the shuttle and stopping the loom on the

breaking of the weft; and in figs. 5 and 7, in the positions which they retain so long as the weft is entire or unbroken; *l*, represents a strong catch in a spring for holding the catch in the positions shown in figs. 5 and 7; *n*, a stop for limiting the range or motion of the catch *l*; *o*, a trigger, which urges the catch *l*, into the position shown in figs. 4 or 6, when, by the breaking of the weft, the trigger is subjected to the action of the shuttle bolt *d*.

"There are bridles *p*, screwed to the plate *s*, and between which and the plate *s*, the catch and the trigger are made to act on their respective centres of motion; *q*, is a link to the catch of the right hand lock, in order that the action of the trigger may produce the same effect by the passage of the shuttle from left to right, as on the opposite lock by passing from right to left; *r*, is a stud, which, passed through the groove in link *q*, and being screwed into the plate *s*, retains the link *q*, in its proper position; *s*, is a strong metal plate, to which the pieces shown thereon are attached, and which together I denominate a lock.

"These locks require to be fixed to the batten in such position that when the bolt *d*, is withdrawn by the tension of the weft, the lower extremities of the triggers may hang freely in the shuttle groove or cavity *i*; and also, in case of the weft breaking, so as to ensure the catch *l*, locking into the staple or sheath *k*, of the shuttle groove or cavity, before the shuttle can reach the swell in the shuttle box.

"In figs. 8 and 10, a right hand lock and a left hand lock are shown in their respective positions on the batten.

"It is necessary also to attach a guide to the double box end of the batten, to prevent the shuttle being driven from the lock; such a guide is shown and marked *g*, in figs. 8 and 9, but I do not claim such guide as part of the invention for which I have obtained his Majesty's Letters Patent, or any exclusive right to the use of the same.

"I proceed to explain the working or operation of my improved shuttles and locks.

"On reference to figs. 1, 2, and 3, it will be seen that the weft is passed in succession through the clams *c, c,* through the loop or crank in the bolt *d,* and then through the eye in the front of the shuttle; and the essential precaution and care being taken to cause the drag or friction upon the weft, in passing through the clams, to be greater than the force necessary to draw the spring *h,* it will be evident that so long as the weft is entire, and drawn tight, as in the operation of weaving, the bolts *d,* will be drawn towards the front of the shuttle, and that the cavity or groove *i,* will be free from obstruction by the bolt; the lower extremity of the trigger will be free from obstruction in the cavity or groove, and the catch *l,* will, during the same time, be held out of the cavity or groove by the spring *m,* as shown in figs. 5 and 7. In the event, however, of the weft breaking, it will be equally evident that the spring *h,* being no longer counteracted, will propel the bolt *d,* across the cavity or groove *l,* in consequence whereof it will, on the shuttle being thrown, come in contact with the trigger *o,* and cause the opposite end thereof to urge its respective catch *l,* into the position shown in the figs. 4 or 6; the catch *l* will have fallen into the staple or sheath *k,* fixed in the groove or cavity *i,* and thereby have prevented the farther advance of the shuttle.

"The breaking of the weft having thus occasioned the shuttle to be arrested in its progress before reaching the swell in the shuttle box, the swell gives way to the pressure of the finger on the stop rod, and by the consequent fall of the stop rod catch, in the usual manner, the working of the loom is stopped, and a proper opportunity given for the necessary adjustment to be made.

"Although I have described two spring clams for passing the weft through previous to its going through the loop

in the bolt, I do not confine my claim to invention to that precise method, but sometimes I use a single clam, and at others I pass the weft over a cushion, instead of through clams, the essential precaution required to accomplish my plan being to cause a greater drag or friction to be applied to the weft in its passage from the cop or bobbin to the shuttle bolt, than is requisite to draw the bolt to the front of the shuttle in opposition to the effect of the spring *h*.

"The batten, instead of being made fast to the reed, is sometimes attached to springs connected with the swords of the batten, whereby an effect of elasticity is given, which the batten would not otherwise possess; but for the production of a different figure, such as a solid stripe or cord across the work, the elasticity is required at intervals only, and I then regulate the same by the following means:—

"Fig. 8, represents the right hand end of a batten; fig. 9, represents part of the same seen in place; fig. 10, represents the left hand end of a batten; *t*, is a bar, extending along the cap of the batten, and partly over the double shuttle box, at the right hand; *v*, is a staple attached to the bar; *w*, is the spring connected with the sword of the batten, and to which the reed is attached; and as a similar spring is attached to the other sword of the batten, a corresponding staple is attached to the bar *t*. It will be seen, on inspection of the plan (fig. 9), that the spring *w*, will be confined when the bar *t*, is in the position there shown; but that the spring *w*, will be unconfined when, by the bar being drawn to the left, the staple *v*, is in the position indicated by dotted lines.

The general position of the bar *t*, (and in which it is held by a spring connected therewith, and also with the cap of the batten,) is that which leaves the spring *w*, uncontrolled by the staple *v*; *x*, is a roller, moveable on a pin

or stud, which is firmly attached to the bar *t*; *y*, is a metal draw piece, fixed to the double shuttle box, one side of it being an inclined plane, which, by the raising of the shuttle box, is made to act against the roller *k*, and by drawing the bar *t*, to the right, confines the spring *w*, by the staple *v*; *z*, is a roller, moving on a stud attached to the batten, to prevent the bar *t*, being raised up by the action of the draw piece *y*.

"I have described the operation of the bar *t*, as effected by the draw piece *y*, fixed to the double shuttle box; but as the motion of the double shuttle box is derived from a cam or excentric, any similar agency may be employed for changing the position of the bar *t*, independent of the shuttle box; and thus, without stopping the loom, the elasticity of the batten is increased and diminished in the manner required for the production of the particular figure in the work.

"Fig. 11, is a longitudinal section, and fig. 12, a plan of an improved lever, to be attached to the axis of motion of the batten, usually called the fiddle-stick; A, is a metal roller; B, a piece of metal, moveable within the box A; C, a spiral spring, attached to the extremity of the box, and to the piece B, for the purpose of drawing it in a direction from the pulley; D, a pulley or a crank, on an axis in the box, coinciding, or nearly so, with the axis of motion of the batten or fiddle-stick; E, a loop or hook, fixed to the piece B, and moving freely in a slit or opening in the box A; F, a plate, screwed to the box A, and limiting by position the range of the pieces B, and E, in the direction from the centre of motion.

"The operation and effect of this apparatus is as follows:—The moveable piece B, is connected with the taking up motion of the loom by the loop E, and also with the cam or excentric, by a cord or chain, directed by the pulley

or crank D. The distance of the loop E, from the centre of motion of the fiddle-stick, and, consequently, the working length of the lever, is governed and varied by the action of the cam according as it suffers the loop E, to be drawn by the spiral spring C, against the stop piece F, or draws it to a required position nearer to the axis of the fiddle-stick, and the quantity taken up by the cloth roll, and the number of picks to the inch, is regulated thereby.

"I claim distinctly as my invention the improved shuttle and locks, the apparatus for regulating and varying the effect of the batten, without stopping the loom, and the apparatus for regulating and varying the number of picks to the inch, and the taking up of the cloth without stopping the loom, with any modification of my said inventions, by means of which the same useful purposes may be effected; but I do no not claim as my invention the other parts of a loom, shown in the drawings, and referred to or mentioned in this Specification, in order only that the nature of my inventions might be more fully understood."—[*Inrolled in the Rolls Chapel Office, October,* 1833.]

Specification drawn by the Patentee.

To JOHN HARVEY SADLER, *of Praed-street, Paddington, in the county of Middlesex, engineer, for his having invented certain improvements in looms.*—[Sealed 1st July, 1830.]

THESE improvements in looms consist in a mode of connecting two looms together so that the manual labour of one person may actuate both looms simultaneously.

The driving power to be employed for this purpose is an oscillating pendulum, which, on being swung to and fro,

gives motion, through certain segment levers and cords, to the battens of both looms, and also to the treadles or harness that raise and depress the sheds of the warp, and likewise to the pecker levers which work the shuttles, and through other connexions to the beams that give out the warp, and that take up the work when woven.

No variation is proprosed in the construction of any parts of the looms, but simply that a horizontal shaft, having segment levers at its ends, shall be placed transversely over the two looms, with a pendulum affixed thereto in the middle, which, being made to vibrate by the hands of the weaver, will, through the agency of cords attached to the segments, and to the ends of vertical levers connected to the working parts of the loom, cause the several movements of the machinery, much in the same way as in a loom constructed to work by the power of steam or water.

A variation in the plan is, instead of the segments, to attach the ends of the vertical levers which actuate the working parts of the loom to cranks in a horizontal shaft made to vibrate by a pendulous movement, as before described.—[*Inrolled in the Inrolment Office, January,* 1831.]

To Robert Busk, *of Leeds, in the county of York, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in apparatus used for distilling and rectifying.* —[Sealed 26th January, 1830.]

The subject of this Patent is a peculiarly formed vessel, through which the vapour emitted from a still is intended to pass, in order to assist the evaporation and condensation of the spirit.

Various constructions of apparatus of the same kind have been devised, principally to economise fuel in throwing off the spirituous vapour from the wash, and to promote a rapid condensation of the aqueous parts before it reached the worm. The leading features of these contrivances have been, to bring the heated vapour, as it was evolved from a lower vessel, to act against the under part of an upper vessel containing wash, and by that means to cause a succession of vessels placed one above another and heated by the ascending fluid, each of them to give off the spirituous vapour; and also, by the vapour coming in contact with a cooler medium, to promote the condensation of the aqueous parts, and allow the lighter and more spirituous fluid to pass on to the worm in the refrigerating tub.

An apparatus of this sort was the subject of a Patent granted to J. J. Saintmare, dated 28th June, 1825 (see Vol. XIII. of the London Journal of Arts and Sciences, First Series, page 198); another to E. D. Philip, dated 29th November 1828 (see Vol. IX. of the Second Series, page 138); and another to D. T. Shears, 31st March, 1830 (see Vol. VII. of the Second Series, page 61); all of which contain the leading features above alluded to, and which features are embodied in the subject now before us.

Plate XIII. fig. 1, represents the apparatus in section taken vertically through the middle; *a*, is the still containing the wash, which is to be erected over a fire as usual, for the purpose of generating a spirituous vapour; on the top of this still a vessel *b*, is placed, also containing wash, which becomes heated by the ascending vapour from the still below. A tube *c*, conducts the steam and alcoholic vapour from the still *a*, into the upper part of the vessel *b*, from whence it passes through the tube *d*, to the under part of the vessel *e*, containing another portion of wash, and having these acted against the false bottom and par-

tially heated the wash, the vapour proceeds up the tube *f*, to the top of the vessel *e*, and through another tube *g*, to the lower part of the vessel *h*, and so on through the tubes *i*, and *k*, under the vessel *l*, and through the tube *m*, and passes by the tubes *n*, and *o*, over the surface of the water in two close vessels *p*, and *q*, from whence it escapes by the tube *r*, at top, into the refrigerating worm, usually employed to condense the alcoholic vapour: having in its progress partially heated the several vessels containing wash, and, by so doing, having caused the heavier or aqueous parts of the vapour to condense and flow back into the wash in the vessel beneath.

Thus far the present apparatus resembles those above alluded to, but the particular feature of novelty here proposed, is a central cylindrical vessel *s, s*, into which the wash is to be first passed from the reservoir *t*, above.

When the stop-cock *n*, is opened, the wash flows into the cylinder, and rises at the same time in the longer leg of the syphon-pipe *v*, until it has reached the level shewn, when the wash is enabled to pass over the neck of the syphon, and to flow through the shorter leg into the vessel *l*.

The wash having filled the vessel *l*, up to the level of the aperture of the descending pipe *w*, it flows from thence through that pipe into the next vessel *h*, and then through a similar descending pipe to the vessel *e*, and from that vessel in the same manner to the lower vessel *b*, by which means all the vessels become charged with wash.

The apparatus may be discharged of the wash after the process has been performed, by drawing it off through the long pipe *x*, to which all the vessels are connected by short horizontal pipes, with stop-cocks in each.

In the apparatus thus arranged, the wash in the central cylindrical vessel will become partially heated before it passes into the several vessels *b, e, h, l*, and any alcoholic

vapour emitted from it will be given off at top through a small pipe *y*, which leads to the worm; the vapour, as it passes occasionally in contact with the external surface of the cylindrical vessel, will be partially condensed.

The claim of novelty in this improved apparatus is the adaptation of the central chamber through which the wash becomes heated, and the aqueous parts of the vapour condensed.—[*Inrolled in the Inrolment Office, July,* 1830.]

To ABRAHAM GARNETT, *of Demerara, Esq., for his having invented certain improvements in manufacturing Sugar.*—[Sealed 24th July, 1830.]

THE particulars of this improved mode of preparing sugar are not very clearly described in the Specification. It appears, that the object of the Patentee is to promote the crystallization or concentration of the sugar by the employment of an apparatus, in which a partial vacuum is produced above the syrup in the pan or *teach,* as it is called.

Plate XII. fig. 13, is a sectional representation of a series of pans or boilers, in which the cane juice is placed for the purpose of boiling and evaporating; *a,* is the last pan of the series called the *teach,* into which the syrup is to be poured by a ladle from the pan preceding it. The upper edge of the *teach* has an inclined flange, upon which the edge of the hemispherical cover *b,* shuts down with an air-tight joint. This cover may be raised and lowered by a chain and pulley, by means of a lever or otherwise, and a safety valve *c,* is placed in the upper part of the hemisphere to allow of the escape of steam when the syrup is boiling.

According to the statement of the Patentee, the heat of the boiling syrup will cause the atmospheric air to be expelled from the dome or hemispherical cover, and by that means produce a partial vacuum within. Under this partial vacuum, the evaporation from the syrup will go on with a rapidity very much greater than if the surface was exposed to the atmosphere, and the steam evolved will escape through the valve *c*, at top, thereby leaving the dome vessel in a constant state of exhaustion.

As the evaporation goes on from time to time, fresh supplies of the syrup are to be introduced from the adjoining pan, in which cases the dome is to be raised a few inches only while the syrup is poured in, and then the pan is to be closed again air-tight, the steam thrown off by the boiling of the syrup escaping at the safety valve.

When the syrup has acquired a sufficient degree of concentration, it may be discharged into the ordinary cooler, and, after remaining there for twelve hours, may be placed in boxes having wire gauze bottoms, to allow of the molasses draining through; and, after six days, may be packed as Muscovado sugar and sent to market.

There is an observation at the close of the Specification, that if the sugar is to be clarified by Innes's Patent process, it may be drawn out of the *teach* from time to time; and, upon every thickness of about three inches of syrup, a slight shower of lime-water is to be let fall for the purpose of cooling it. What patent process is refered to, we know not, as no Patent has been granted in that name for refining sugar within the last thirty years.—[*Inrolled in the Inrolment Office, January,* 1831.]

To JOHN RUTHVEN, *of the city of Edinburgh, engineer and manufacturer, for his having invented or found out an improved machinery for navigating vessels and propelling of carriages.*—[Sealed 5th August, 1830.]

THERE are three distinct objects contemplated by the Patentee; first, a novel mode of forming the paddles of a propelling wheel, in order that they may present a broad extended surface, always acting directly against the water in propelling a vessel, and yet leaving the water edgeways; secondly, a mode of applying manual labour as a power to propel vessels on water or carriages on land; and, thirdly, a peculiar method of working pumps on shipboard.

The manner in which the first of these objects is to be effected is shown in Plate XII. fig. 14, which represents part of a propelling wheel, seen sideways; *a*, is the central part of the wheel or block into which the arms *b*, *b*, *b*, are inserted; *c*, *c*, is one of the side rings, forming the periphery of the wheel, to which the outer extremity of the spokes are affixed for the purpose of affording strength. To these spokes, on each side of the wheel, the respective paddles are attached, which consist of semi-cylindrical surfaces *d*, *d*, *d*.

These semi-cylindrical paddles may be formed by bent plates of metal, or they may be made of wood in the manner of barrels by a series of staves bound together by a strap of metal passed round them, and bolted or screwed to the opposite spokes on both sides of the wheel.

This form and construction of paddle, it is presumed, will suffer little or no resistance in quitting the water, and will, in the act of propelling, present a more uniform surface to the water than any other kind of paddle heretofore adapted to that purpose.

The second feature of the invention is shown at fig. 15,

consisting of two toothed wheels *a*, and *b*, of equal diameter, taking into each other, and a pinion *c*, in gear with the wheel *b*. These are mounted on axles turning in suitable bearings, and two forked levers *d*, and *e*, are placed upon the axles of the wheels *a*, and *b*, turning loosely thereon.

The levers each carry a pall, which palls respectively take into the teeth of the wheels *a*, *b*, and the levers are connected together at top by a bar *f*, with joints : the bar having cross handles at each extremity, by which it may be pushed and pulled to and fro by manual labour, for the purpose of communicating to the main shaft *c*, a continuous rotary motion.

It will be perceived, that the wheels *a*, *b*, by gearing into each other, will turn in opposite directions, and, in consequence of this, the palls attached to the vibrating levers *d*, and *e*, are placed on opposite sides, so that the pall taking into the wheel *a*, may drive that wheel as the levers and bar pass in one direction, and the other pall, taking into the wheel *b*, may drive that wheel when the levers and bar pass in the opposite direction. Hence the to and fro movements of the levers and bar cause a rotary motion of the two wheels *a*, and *b*; and the latter, taking into the pinion *c*, will cause that pinion and its axle to turn continually in one direction.

In this way it is proposed, by means of manual labour, to work the paddles for propelling merchants' ships and men of war; the paddle wheels being fixed upon the ends of the shaft *c*, which may be supposed to extend out on each side of the ship.

Another modification of this reciprocating movement is applied to the working of pumps, and constitutes the third head of the invention: fig. 16, shows a pump; *a*, is the barrel; *b*, a perpendicular rod connected to the bucket; *c*, a wheel or circular cam, turning upon an axle or pivot passed

through its rim, and which axle or pivot is supported by the bracket *d*, affixed to the side of the barrel. From the rim of the wheel, in the form of a tangent, a vertical arm *e*, rises, which is by a joint connected to the horizontal bar *f*.

If reciprocating movements be given to the bar *f*, to and fro, in horizontal directions, the jointed arm *e*, will cause the wheel *c*, to rise and fall, turning upon its pivot on the bracket *d;* and two friction rollers, which are placed in the upper part of the bucket rod *b*, acting against the curved surfaces of the interior of the wheel, and of the cam *g*, will, as the bar and wheel vibrate, cause the bucket to be raised and depressed.

Two pump barrels may be placed nearly together, each having a bucket, rod, cam, and tangent arm, as described, and, the upper part of each arm being attached by a joint to the vibrating bar, both pumps will be worked simultaneously by the labour of the men exerted in pulling and pushing the bar to and fro; or one wheel mounted upon a central axle between the two pumps, with curved cams extending from the periphery of the wheel, may be made to work both pumps, by means of a reciprocating movement given to the wheel through the vibrating bar worked by manual labour, as described.—[*Inrolled in the Inrolment Office, February*, 1831.]

To GEORGE RODGERS, *of Sheffield, in the county of York, merchant, and* JOHN TATUM, *of Hilton, in the county of Derby, gardener, for their having invented an improved button.*—[Sealed 4th April, 1833.]

"THIS invention consists in making the shank of the button a bar or tube, with a screw cut on one end, or both ends of it, and attaching a disc to each end, one disc to be fixed immovably on the shank, and the other to be screwed on,

or both to be screwed on, but in no case are both discs, to be fixed immovably on one shank, see Plate XII.

"Fig. 17, is a view of one of the improved buttons; *a*, is a disc, forming the face of the button, which may be gilt, embossed, or covered with silk, cloth, or other fabric, as it may suit the manufacturer; *b*, is the shank, and as this figure is supposed to represent a metal button, one end is soldered to the disc *a*, while the other end has a screw cut on it to receive the other disc *c*, which screws on to it, and in large buttons may be made considerably smaller than the disc *a*. The small disc *c*, should have holes pierced in it, as shown in plan, fig. 18, in order to attach the button to the garment, as will be hereafter explained. Fig. 19, is a side view of one of our improved buttons, in which the disc A, is screwed on to the shank B, and the disc *c*, is soldered to the opposite end of the shank; and fig. 20, is a side view of one of our improved buttons, having a shank soldered on to each disc, screwing together in the middle; fig. 21, is a plan of the disc *a*, and it is evident the screw may be made to pass completely through the disc or otherwise, according to the thickness of the disc, or the pleasure of the manufacturer.

"In order to attach these buttons to any garment, it is only necessary to pierce a small hole, or work an eyelet hole in the fabric of which the garment is made, and putting a disc at each side, screw them together by means of the shank or shanks; or if it be required to conceal the back disc, then it may be introduced between two thicknesses of the fabric, and sewed fast to the back one by means of the small needle holes shown in fig. 18.

"Now whereas we claim as our invention the improvement hereinbefore described."—[*Inrolled in the Inrolment Office, October,* 1833.]

Specification drawn by Mr. Rotch.

To Thomas Bulkeley, *of Albany-street, Regent's-Park, in the county of Middlesex, M.D., for his having invented certain improvements in propelling vessels, which improvements are also applicable to other purposes.*— [Sealed 19th July, 1830.]

There are two objects proposed under this patent, the first is a mode of constructing paddle wheels for propelling ships and other vessels on water, so as to admit of their being readily placed and displaced when at sea, which will allow of their being occasionally employed on board men-of-war or merchantmen, and the progress of the vessel thereby facilitated by the labour of the seamen, without steam power; secondly, a contrivance by which manual labour may be conveniently applied through the capstan of the ship for working the propelling wheels.

Plate XIII. fig. 2, is a view of the entire apparatus as seen longitudinally, the side of the vessel being supposed to be removed for the purpose of exposing the mechanism within; *a*, is the shaft on which the paddle wheel is to be mounted, which of course must extend on both sides beyond the hull of the vessel. Upon this shaft a circular block is fixed, also on the outside of the hull, and into this block the ends of the arms *b*, *b*, of the wheel are to be inserted and made fast by wedges and bolts. The outer extremities of the arms are intended to receive the segments or pieces *c*, *c*, of the rim of the wheel, which are to be put together and secured by bolts and screws, and when that has been done, the paddles *d*, *d*, are to be attached and made fast by bolts and screws also, in the positions shown in the figure.

By so constructing paddle wheels, they may be readily put together and attached by the men whenever that mode of propelling should be found desirable to assist the

progress of the vessel; and when they are required to be removed, they may be readily taken to pieces, and stowed away in any convenient part of the ship.

The mode by which these paddle wheels are to be worked in the absence of steam power, is also shown in the above figure.

On the axle *a*, of the propelling wheel within the vessel, there is a toothed wheel, into which another wheel *e*, is geared. This wheel *e*, is fixed upon the axle of a pulley *f*, over which pulley an endless rope is passed, and is conducted by other rollers, and also embraces the capstan *g*.

The axles of the wheels *a* and *e*, are supported on strong timbers fastened to the deck of the vessel, and, by the tension of the endless rope, passed round the pulley *f*; when the capstan is driven round, the propelling wheels are made to revolve also.

By the employment of this contrivance, it is intended to propel vessels at sea by the labour of the hands on board, which, it is considered, will be of very great advantage in navigation under some circumstances, particularly in calms, and against adverse winds.—[*Inrolled in the Inrolment Office, January*, 1831.]

To William Taylor, *of Wednesbury, in the county of Stafford, engineer, for his having invented certain improvements on boilers and apparatus connected therewith, applicable to steam engines, and other purposes.*—[Sealed 19th July, 1830.]

There are three improvements proposed under this Patent, first, a mode of feeding the boiler with water whenever it requires a fresh supply, which supply is regulated by the

descent of the float; secondly, a method of protecting the internal surface of the boiler from that incrustation which is usually occasioned by the deposit of earthy matters as the water evaporates in steam; and, thirdly, an apparatus to effect the more perfect consumption of smoke in steam boilers and other furnaces.

Plate XIII., fig. 4, represents the boiler and its appendages in vertical section, taken longitudinally through the middle, and showing also the furnace, flues, and chimney; *a*, is the boiler; *b*, the reservoir above, by which the boiler is supplied with water; *c*, is a descending tube through which the water passes from the reservoir into the boiler; *d*, is an ascending tube by which the steam passes up into the reservoir; *e*, is the float in the boiler, which is supported by the buoyancy of the water.

A stop cock is placed in each of the tubes *c* and *d*, with arms or levers extending therefrom, and the guide rod of the float is passed through slots in the ends of these levers.

By this arrangement it will be perceived that as the surface of the water in the boiler becomes depressed, the float will descend and draw down the arms or levers of the stop cock so as to open their passage ways; the water will then descend into the boiler through the tube *e*, and at the same time the steam will rise into the reservoir through the tube *d*, thus equalizing the pressure in both, and keeping the valve closed by which water passes into the reservoir.

When a sufficient supply of water has passed into the boiler the float will have risen, and both cocks will become closed, and the pressure of steam in the reservoir being thereby removed, the inlet valve *f*, will then open, and allow the water to flow into the reservoir.

In order to prevent an incrustation on the inner surface of the boiler, the lower part of the boiler has a cylindrical recess extending along it, as shown at *g*, *g*, and more clearly

seen in the transverse section of the boiler shown at fig. 5, As the earthy particles fall from the water, they will necessarily deposit themselves in the lower part of the boiler, and, as the Patentee considers, will by the pressure of the steam above, be forced into the cylindrical recess or gutter *g*, from whence, as occasion may require, all sediment may be drawn through the tube and cock *h*, inserted into the end of the cylindrical gutter, and thereby, any incrustation on the lower part of the boiler will be prevented.

This cylindrical receptacle for the precipitated earthy matters let fall from the water, is placed in the lowest part of the boiler for the purpose of removing it as far as possible from the fire; in a waggon or other formed boiler, however, it may be placed on the sides, and answer the same purpose.

The means proposed for consuming the smoke evolved from the furnace, consist in the application of an air pump and suitable pipes, by which the smoke is drawn from the chimney, and is forced into the furnace again, there to be consumed by the burning fuel.

In the longitudinal section of the boiler, furnace, and flues, fig. 4, the smoke and vapours emitted from the furnace *i*, pass along the flues *k*, round the boiler, and into the chimney *l*. In this chimney there is a side opening *m*, for the admission of air; but the top of the chimney is closed, and a descending pipe *n*, *n*, is placed within the chimney, which leads down to the air pump *o*. When the fuel in the furnace is first ignited, the air pump *o*, is to be set to work, which may be done by hand or by any convenient attachment to the working parts of the steam engine, the effects of which will be, that the smoke which rises through the flues into the chimney will be drawn down the pipe *n*, *n*, owing to a partial exhaustion of the air produced in the pipe by the action of the pump, and

on the returning stroke of the pump, that smoke and vapour will be injected through the small pipe *p*, into a box or recess *q*, under the grating or fire plate of the furnace, from whence it will pass through the grating, and over the ignited fuel, where the combustible parts of the smoke and vapour will become consumed.

In conclusion, the Patentee claims as the particular features of his invention, first, the mode of feeding the boiler by means of a separate vessel or an auxiliary reservoir, from which the water is admitted by the contrivance described; secondly, the adaptation of a receptacle below to receive the deposition of earthy matters in the way described, observing, that though such a contrivance has been employed in connection with an apparatus for crystallizing salt, yet the like has not been applied to a steam boiler for the purpose now contemplated; and, thirdly, the mode of consuming the smoke and vapours emitted from the furnace and flues by the employment of an exhausting and injecting air pump, with suitable conducting pipes, in the way described.—[*Inrolled in the Inrolment Office, January,* 1831.]

To WILLIAM COOK, *of Redcross-square, Cripplegate, in the city of London, fine-worker, for his having invented certain improvements on cocks for supplying kitchen ranges or cooking apparatus with water, and for other purposes, to be called fountain cocks.*—[Sealed 7th September, 1830.]

THIS is a cock having two channels through the plug, by means of which, on hot water being drawn out of a boiler

of a cooking apparatus, cold water flows in to supply its place, and thereby prevents the possibility of the boiler becoming dry.

Plate XIII., fig. 6, represents a section of part of a boiler with the improved cock attached thereto. It will be seen that there are two channels, *a* and *b*, in the barrel of the cock, one of which, *a*, passes directly through the plug and through the nozzle; this is for the purpose of delivering hot water from the boiler; the other channel, *b*, passes only about half way through the plug, as shown in the horizontal section fig. 7, and then turning round in a horizontal direction, returns into the boiler: this is for the purpose of supplying the boiler with cold water.

To the inner extremity of the channel *a*, a vertical pipe *c*, is affixed, which extends toward the upper part of the boiler, but below the level of the water's surface; by this contrivance, the water is always drawn off from the upper part of the boiler, where it is hottest.

At the inner extremity of the channel *b*, another vertical pipe, *d*, is connected, which extends upward through the top of the boiler, to a cistern or reservoir containing cold water, with which the pipe, of course, is continually filled.

It will now be seen that on turning the plug of the cock so as to allow of the direct passage and discharge of the hot water, as shown in the figure, one extremity of the semicircular channel in the lower part of the plug will be brought in coincidence with the supply pipe, and thereby allow the cold water to descend from the cistern above, and to pass through the semicircular channel of the plug into the boiler.

As the supply of cold water passes from a cistern at an elevation greater than that of the boiler, it is necessary that the aperture of the pipe *b*, should not be quite so large as that of the pipe *a*, otherwise the pressure of the water

above would cause it to flow faster than that which is drawn off from the boiler.

By this contrivance it will be perceived that whenever hot water is drawn from the boiler, a corresponding quantity of cold will flow in, and hence that the boiler can never be left dry, so as to subject it to burning or exploding by the sudden generating of steam.—[*Inrolled in the Inrolment Office, March,* 1831.]

To ROBERT CLOUGH, *of Liverpool, in the county palatine of Lancaster, ship broker, for his invention of an improved supporting block to be used in graving docks, and for other purposes.*—[Sealed 5th August, 1830.]

AN inconvenience arises from the employment of solid blocks of large dimensions for supporting ships under repairs, and for other similar purposes, from the difficulty of removing such cumbrous bodies as the solid blocks from under the vessels after the repairs are complete. To obviate this inconvenience, therefore, the Patentee proposes to construct blocks for such purposes, by bracing and wedging together pieces of such forms as may, when combined, constitute firm and solid blocks, and be capable of easy separation for removal.

Plate XIII. fig. 3, represents one of the blocks made of several pieces, and bound with iron straps screwed and bolted round the block, as it would appear by the screws or pins set round it; but, as no farther description is given, we are unable to explain the contrivance more particularly.

In conclusion, the Patentee says, that this improvement is applicable as a graving block for docks, for sup-

porting ships while under repair; for fids to support the top-mast of a ship; for building blocks and for other purposes, as it is capable of being readily put together, and as readily separated and displaced.—[*Inrolled in the Inrolment Office, February,* 1831.]

To JOSEPH MAYBURY, JOHN MAYBURY, *and* JOSEPH MAYBURY *the Younger, of Belton, in the county of Stafford, iron masters, for their having invented certain improvements in polishing or planishing, and manufacturing or making of ladles, spoons, and other articles, for culinary, domestic, and other purposes, made of iron, and tinned.*—[Sealed 24th January, 1832.]

IT does not appear very evidently how the subject of this Patent can be called an improvement in making ladles and spoons, as the improvement, if it can be so called, consists, simply in passing tinned plate iron between a pair of smooth iron or steel rollers for the purpose of planishing its surfaces.

The construction of the apparatus has no appearance of novelty, it is merely a pair of rollers formed truly cylindrical, and hardened on their surfaces by what is called chilled casting; these rollers are made to revolve together by suitable gearing, driven by any rotary power, and on passing the tinned iron through the aperture between them, it acquires a smooth surface.

The process of making the ladle or spoon is described to be this:—after cutting out of the flat sheet of the best iron the suitable form, of which the spoon or ladle is to be made, which may be done either by a stamping press or otherwise, the piece is to be submitted to what is called pickling, and

is then tinned in the ordinary way; after tinning, the piece is to be passed between the smooth rollers, which planishes its surface—an operation hitherto done by the hammer and hand.

The pieces being thus planished or polished by the rollers, are then ready to be wrought into the proper shapes of spoons or ladles; that is, the bowls are to be sunk and the backs bent, which is done in the ordinary way by the workman. This is the whole matter of the invention.—[*Inrolled in the Inrolment Office, March,* 1832.]

To Sir Charles Webb Dance, *of Hertsbourne Mannor Place, in the parish of Bushey, in the county of Hertford, Knight, Lieutenant Colonel, for his invention of certain improvements on steam boilers.*—[Sealed 28th of April, 1832.]

The subject of this Patent is a peculiar arrangement of tubes for the passage of water into a boiler intended to be employed for generating steam for driving an engine which is principally designed for locomotive carriages.

Plate XIII. fig. 8, exhibits a section of the boiler taken vertically through the middle, in which the furnace and tubes are exposed to view.

The external form of the boiler is proposed to be as a frustrum of a cone *a, a, a, a,* in the centre of which is a cylindrical vessel containing the furnace *b,* and the series of rings or annular pipes *c, c, c,* by which the water is conducted into the boiler, the top of this central vessel being contracted for the purpose of constituting a chimney to carry off the smoke from the furnace.

By this arrangement, the water admitted into the circular pipes at *d,* flows through the upper ring *c,* and from

thence, by a small descending pipe, into the next ring, and so on through the whole range of annular pipes, and from the lower ring *c*, passes down to the ring *e*, at bottom, which is a coil of pipes intended to constitute the bars or grating of the furnace.

The fuel being ignited in the furnace *b*, its heat operates upon the water in the surrounding vessel *a*, *a*, which constitutes the boiler, and also upon the water in the pipes *c*, *c*, *c*, above that part on which the fire is least intense, being at the top of the annular range of pipes where the water is admitted.

The water, in descending through the range of annular tubes, becomes progressively heated, and after passing through the coil *e*, under the furnace, proceeds by a bent pipe *f*, upwards into the outer vessel *a*, *a*, in a boiling state.

The steam thus generated, occupies the upper part of the boiler, and is carried off to work the engine by the pipe *g*, having a rose head or perforated sphere at top, through which the steam passes. There is a safety valve *h*, at top of the boiler to prevent accident.

The Patentee says, that he claims as the leading features of this invention, first, the combination and arrangement of the series of tubes within the central vessel, by means of which the water is caused to flow in at the upper part where the heat is least intense, and to descend thence to the lower part, where the heat is greatest; secondly, he claims the construction of the fire bars by means of a coil of pipes at bottom, through which the water is made to flow, and which coil of pipes are so mounted upon joints connected to the descending pipe leading from the rings *c*, and to the ascending pipe *f*, that the whole of the grating may be turned over, and the fuel instantly discharged in case of emergency, to prevent accident. This latter con-

trivance is not, however, so described in the Specification as to enable any one to make it work in the way alluded to. —[*Inrolled in the Inrolment Office, October*, 1832.]

To JOHN HALL, *the younger, of Dartford, in the county of Kent, engineer, in consequence of a communication made to him by a foreigner residing abroad, for a machine upon a new and improved construction for the manufacture of paper.*—[Sealed 9th November, 1830.]

THIS is a machine for making endless paper, that is, a perpetual length of paper, by the continued rotary operation of a cylindrical mould covered with a wire gauze. The leading feature of the invention is a mode of supplying the vat in which the cylindrical mould is immersed with a copious flow of water, for the purpose of creating a considerable pressure on the external surface of the cylinder, and thereby causing the fibres of the paper pulp to adhere to the mould.

Plate XIII., fig. 9, is a longitudinal section of a machine of the usual construction for making paper; *a*, is the vat or vessel in which the pulp is placed, ready to be discharged on to the mould; *b*, is a mould formed as a cylinder or drum, the periphery of which is covered with wire gauze, like the ordinary moulds for making paper; *c, c*, is a semi-cylindrical vessel or vat in which the mould drum is immersed and made to revolve by any convenient means; and the paper pulp is caused to flow from the vat *a*, into the vessel *c*, at the bottom part.

On the opposite side of the mould drum to that on which the pulp vat is situate, a trough *d*, is placed, and into this trough a very copious flow of water is delivered, which passes from thence into the semi-cylindrical vessel *c, c*.

In the interior of the cylindrical mould a bent tube *e*, is introduced, on the horizontal part of which tube, on one side, the mould revolves. This tube is connected at the outside to a pump, and, by the operations of this pump, the water is drawn from the interior of the cylindrical mould.

By these means the water in the semi-cylindrical vessel, on the outside of the drum, is kept at a considerably higher level than that within; and, consequently, the pressure of the water, as it passes through the wire gauze, will cause the fibres of the paper pulp to adhere to the surface or periphery of the mould.

The water which is drawn from the interior of the drum by the tube *e*, is conducted round and into the trough *d*, where its discharge is impeded by several partitions *f*, which cause the water to flow with a gentle stream into the mould vat.

In order to keep the pulp properly agitated in the mould vat, a segment frame *g*, having rails extending across the vat, is moved to and fro, and, as the drum goes round, the fibres of the pulp are forced against its periphery, and as the water protrudes, the fibres adhere and form the sheet of paper, which, on arriving at the couching roller *h*, is taken up by the endless felt *i*, *i*, and conducted away to the drying apparatus, and thence to the reel on which it is wound.

The Patentee does not claim any part of the machinery as new, but only the adaptation of a pump to draw the water from the interior of the mould drum, and to throw it into the external surface of the drum, so as to effect the adhesion of the fibres of the paper pulp upon the external surface of the drum or mould, by hydraulic pressure.—[*Inrolled in the Inrolment Office, May,* 1831.]

AMERICAN PATENTS.

(From the Franklin Journal.)

For an improvement in *Fire Arms;* Philip A. Morineau, city of Philadelphia.

The improvements claimed in this patent are intended principally for muskets, fowling pieces, and other guns of that description. In the general construction, these guns resemble some others which have recently been invented in France, but the Patentee claims to have made a much better arrangement of the parts, and it is upon this that he founds his claims.

The gun is loaded at the breech, which is, for this purpose, made to revolve upon lateral trunnions. When the cartridge, with its percussion primer, has been inserted in its place, the breech, in being turned round, cocks the gun. The bayonet is fixed in a more convenient manner than upon the old musket, the absence of a ramrod affording an opportunity so to do.

The advantages which this gun is said to possess over others, are, that it may be loaded and discharged in any position, and with increased celerity; that it has less recoil; that it is secured against damp and wet; that it is not liable to become foul, and is readily cleaned; that its construction is more simple; that it requires no ramrod, with its appendages; that it is cocked and primed by the operation of loading; and that the bayonet is more readily and conveniently fixed.

For *Manufacturing Nails of various descriptions ;* Freeman Palmer, Buffaloe, Erie county, New York.

The object to be accomplished by the machinery used by the Patentee, is the cutting of nails from rolled iron, so that the grain of the iron shall run with the length of the nail. Rollers are to be prepared, which are grooved longitudinally in such a way that iron rolled through them will have the head, and the wedge form of the nail or brad, formed on one or both sides of it, as the case may be. The part to form the heads of two nails stand together, with divisions between them produced by ridges on the rollers. The plate thus rolled is then to be cut into strips crosswise; the length of one or two nails determining the width of the strips. A common nail-cutting machine is then used to cut these strips in the usual way, the cutters, however, being so formed as to adapt them to the shape given to the strips by rolling. The Patentee says—

"This invention or discovery of a *new application* of machinery now in use for manufacturing cut nails to a *new* purpose, viz., that of cutting flexible nails, or such as may be clenched, and will answer the purpose of wrought nails, I specifically claim as my own."

For a *Method of supplying Houses with Water;* William Bryant, Davidson county, Tennessee.

An elevated railway is to extend from the house to the reservoir containing the water. The box or vessel in which the water is to be conveyed hangs below the rail, being attached to a small carriage with wheels which run upon the rail. At the house there is to be a wheel and axle, turning by means of a crank, a rope from which, affixed to the vessel, is of sufficient length to allow it to descend to the

reservoir; if the inclination is sufficient, it will decend by its own gravity, otherwise the rope must be of double length, and pass round a pulley at the reservoir. The bottom of the vessel is furnished with a valve opening inwards, admitting the water when it dips into the reservoir. The claim is to "the principle of supplying houses with water by means of a railway and carriage, and the application of a railway and carriage to that purpose, whilst the person conveying the water remains at the house to which it is conveyed."

For machinery for *Breaking and Cleaning Hemp and Flax;* Arnold Zellner, Giles county, Tennessee.

The machine for breaking the hemp consists of two fluted rollers, one placed above the other. The bottom roller is usually about two feet in diameter; the top one a foot, or more. The spaces between the flutes are about one and a half inch, which breaks the stalk into lengths of about three-fourths of an inch. The feeding is effected by placing the hemp upon an inclined plane, and advancing it, by hand, between the rollers. If properly rotted, it is passed but once through, and is then ready for the cleaner.

The revolving cleaner consists of two circular heads placed upon a shaft, with four beaters of hard wood, or metal, passing from one head to the other. The spaces between these beaters have boards inserted, so as to form a quadrangular box. The circular heads project farther than the beaters, and prevent the hemp from getting beyond them, towards the gudgeons. These beaters revolve in a semi-cylindrical trough, formed of slats, or laths, extending along it, the shives escaping through the spaces

between them. The hemp, held in the hand, is passed in about one-half of its length, and when that is beaten clean, the other end is operated upon.

The dust, &c. escapes through a trunk leading to the outside of the building.

For an improvement in *Cutting Pliers;* Russel Curtis, Springfield, Hampden county, Massachusetts.

The improvement here claimed consists in the insertion of steel cutting dies, in dovetail grooves prepared for the purpose, instead of making the cutting part in one piece with the pliers. Different forms of pliers, and places for the insertion of the dies, are referred to in the description, but the foregoing is the essential point of the invention. Although a simple, we think it a very good thing; in point of principle it is not new, but it may be so in its application to pliers.

For a *Washing Machine*; William H. Cumming, Greensboro, Guildford county, North Carolina.

The clothes, contained in a trough, are to be rubbed between a reeded cylinder, or one covered with small rollers, and a hollow segment of rollers, in a way so much like that adopted in many other washing machines. The patentee has not presented to us any thing which he claims as new, a point in which we think that he has pursued a correct course.

For a *Machine for cutting Fur from Pelt:* Dennison Williams, city of New York.

It is intended, by means of the machine here patented, to cut a portion only of the fur from skins, leaving them still with enough upon them for the manufacture of trimmings, caps, and other articles for which fur is employed. It is stated that whilst a quantity of fur is thus obtained for the manufacture of hats, the pelt will frequently be rendered the more valuable by cutting it down to that part where the fur is finest and thickest.

A considerable number of knives are to be prepared, of such length and width as may be required by the nature of the fur to be cut. Their edges are to be straight, and they are to be pointed at one end; by their opposite ends they are to be fixed in a piece of wood or metal, so that their blades may form an angle of about 45 degrees with the face of the piece in which they are fixed, their edges being even with it, and all lying in the same horizontal plane; they will then stand, in relation to each other, like the slats of a Venetian blind, but they are, in general, to be within one-fourth of an inch of each other. The pointed ends then stand out like the points of a comb, and may be passed through the fur of a skin, laying upon a table. A strip adapted to the purpose is then placed over the points of the knives, by which means the frame by which they are enclosed is rendered complete. A portion of the fur rises above the blades, and this is what is to be cut off. A single knife, called the operating knife, is fixed to a block, which is made to slide over the frame; the edge of this knife just clears those before described, and cuts the fur, to do which the more perfectly it is made to pass in an oblique direction. Another modification of the machine is described, which, however, is the same in principle.

For machinery for *Polishing and Cleaning Rice*; Joshua M. Buskey, city of New York.

A trough, four or five feet in length, and about twenty-two inches in diameter, is to be made in the form of a half cylinder, and this, placed horizontally, is to contain the rice to be cleaned. A cover is made in the same form, which, when put on, renders the cylinder complete. An internal cylinder, supported upon gudgeons, is to revolve within the trough. This may consist of two circular heads, with iron bars extending from end to end, or of a solid cylinder, with projecting spikes. The rice, mixed with emery, or with sand, is to be let fall from a hopper into the trough, when the motion of the internal cylinder will quickly clean and polish it. A fine sieve is afterwards employed to separate the emery, or sand, from the rice.

For a *Rack Wrench*, for turning the nuts of screws; Henry King, Springfield, Hampden county, Massachusetts.

This is intended as a substitute for the screw wrench, to which we think it superior in all respects. The main bar of the wrench is square, and the upper side of it is notched across, to receive a click. The sliding cheek of the wrench is supported by a piece projecting from the back of it, which rests upon the bar. This carries a spring and click, and when the wrench is to be used, all that is necessary is, to push the sliding-piece against the nut, the spring forcing the click into one of the notches on the bar, and thus holding it in its proper place.

LITERARY NOTICES.

The Admirers of the Science of Physiognomy will have a gratifying treat this month, by the publication of a beautifully illustrated Volume, entitled "*Physiognomy founded on Physiology,*" and applied to various countries, characters, professions, and individuals. This valuable work is written by Mr. Walker, formerly lecturer on anatomy and physiology in Edinburgh, and will place the subject on a far more satisfactory basis than has ever been attained before. It presents clear views of all the previous imperfect systems of physiology, and will afford to both sexes, during the long evenings of winter, a fund of delightful and instructive amusement in the critical examination of physiological character.

The medical profession in this country, and on the Continent, are at last to have a joint *periodical* worthy of the present advanced state of physical and surgical knowledge, which cannot fail having the greatest influence on medical science and medical education. As real utility and not gain is the great object in this undertaking, it will be conducted upon the most liberal scale. The numbers will emanate monthly, from the Paris press, where editions will be printed simultaneously in French, German, Italian, and English. The most eminent medical professors in each country are engaged upon the work, which will be farther enhanced by beautifully coloured plates of topographical anatomy, engraved on steel, and as large as life.

The first volume of Sir Thomas Dick Lauder's splendid new work, *The Miscellany of Natural History*, is now completed, and its beautiful contents do credit to his good taste and perseverance. It is devoted to that interesting class, *Parrots*, and the thirty-six elegantly coloured plates which adorn the volume, carry a more complete idea of the whole tribe, than can be found in any work of ten times its expense. The whole of the drawings have been executed by J. B. Kidd, Esq., Member of the Academy of Painting, assisted by that celebrated naturalist, Captain Brown, who is also connected with this valuable and national work.

List of Patents

Granted by the French Government from the 1st of April to the 30th of June, 1833.

PATENTS FOR FIFTEEN YEARS.

To Mr. William Newton, of London, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, 4, Rue Choiseul, for improvements in the manufacturing of pasteboard boxes.

— Sardat, Louis, of Grenoble, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, 4, Rue Choiseul, for a method of constructing railroads on all the roads of France, however great may be the declivity.

— Ferrier, Alexandre, of Paris, for a new kind of telegraph to be used by night and by day.

— Burdin, Claude, of Paris, for a locomotive steam engine to be used on common roads.

— Koymans, Henri Antoine, of Paris, for an ice making machine.

— Guillois, Jean Baptiste, of St. Maur, for an universal motive power called by him Hainsseline.

To Shearman, of London, for an improved method of manufacturing Brussels, Wilton, and Turkey carpets.

— Richard Chamboret, and Co., of St. Chammond, for a new method of manufacturing silk braid.

— Hugues, of Bordeaux, for an agricultural instrument called *Sarclo-semoir-Hugues.*

— Giudirelle, Joseph Marie, for a mechanical apparatus called by him *moderato-moteur.*

— Leo Schurter, of Manchester, for improvements in the construction of railroads.

— Hall, Edward, of Paris, for an improved steam engine.

— Dearne, Charles, for a new corn mill.

— De Yongh, of Tuebwille, for a machine to prepare rovings of cotton and other substances.

— Taririn, Joseph Pascal, for an improved piano-forte.

— Guyon, Brothers, of Dôle, for an economical stove.

— Moineau, Auguste, of Paris, for a fly wheel with perpetual motion, applicable to all cases where a motive force is required.

— Lévy, of Paris, for a cabriolet with a seat for the driver outside.

— Harris, George, of London, for a method of extracting and preparing vegetable substances, and manufacturing with them tissues of all kinds.

— Clement Desermes, Nicolas, of Paris, for a new steam engine with continual action.

— Dupré, André George, of Paris, for a metallic cap to be used as a substitute for wax for stopping bottles containing gaseous waters, spirits, &c.

— Brown, Samuel, of London, for an engine where the vacuum is produced by the combustion of gas.

— Boreary, Jean Baptiste Marie, for the absorption and consolidation of matters extracted from privies.

— Gombert, Jean Baptiste, of Darntal, for a perpetual motive of indefinite strength.

— Guibout and Sanson, of Paris, for an improved method of cleansing privy vaults.

— Hossard, Jules Louis, surgeon, of Angers, for a belt calculated to rectify any deviation in the backbone.

To Favrel, Auguste, of Paris, for a machine to beat gold and silver into leaves.

PATENTS FOR TEN YEARS.

To Villegaudin, Emili de Boueher, of Rennes, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue Choiseul, for an improved self-acting weaver's frame.

— Williams, Coxe, and Chambers, of London, for a new method of combining fibrous substances of various kinds.

— De Boutteville, Elie Audibert, for certain improvements applicable to jennies and billies.

— Jeanne, Benigne, of Paris, for an improved lamp.

— Auffroy, Jacques François, of Paris, for a method of manufacturing vases, bottles, flasks, with hemp thread rendered waterproof.

— Vuillier, Augustin, of Dole, for an economical stove.

— Molinié, Louis, of Saint Pons, for a machine for cutting corks.

— Motte and Pagnon, dyers, of Lyons, for a new process of dyeing in black.

— Pouillet, Charles et Auguste, of Paris, for am improved califier for apartments.

— Steward et Fouju, of Paris, for an improved method of extracting the syrup from beetroot, without using the press.

— Robouam, Adrien, of Paris, for sticks with several branches, to be used as umbrellas.

— Trappe, Gillaume Felix, of Paris, for improvements in the manufacturing and refining of sugar.

— Le Roy de Molard, of Lyons, for a new kind of flooring for apartments.

— Bidreman, Nicolas, of Lyons, for a new kind of cement called by him lithogéne,

— Devoir, Lucien Angelique, of Elbeuf, for a new motive power to be employed tu all the purposes for which steam engines or horse power are used.

— Daveu et Leloup, of Paris, for an economical method of making bread.

To Leroux Dufié, Jean Baptiste Alphonse, sugar refiners, for an improved apparatus, to be used in sugar refineries.

— Crepot, Joseph Francoise, of Paris, for an improved method of polishing the surface of paper without injury to its quality.

— Gaudeville, Etienne, chemist, of Paris, for a chemical process of reviving animal charcoal whose qualities have been exhausted in sugar refineries.

PATENTS FOR FIVE YEARS.

To Laurent, Olivier Hyacinthe Marie, blacksmith, of Paris, represented by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue Choiseul, for an improved fastening for windows.

— Fruiltier, Pierre Charles Marie, of Fery, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue Choiseul, for a new method of twisting applicable to small jennies.

— Mallet, Francois, and Co., carpenters, of Bordeaux, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue Choiseul, for a new kind of portable corn mill.

— Richard Chambovet and Co., for improvements in braid-making frames.

— Desben and Jarden, of Rimes, for an improved machine called by them *loup catteur*, and capable of being worked by horse power.

— Ferrand, Pierre, of Pontay, for improvements in the machine called *cane* or *croches*, and used for preparing cotton for spinning.

— Bordier, Mariet, and Co., of Paris, a new kind of game called decimal chess.

— Youf de Maisons, Jean Michel Francois, of Paris, for a new manner of making bread.

— Grimpé, Joseph, of Paris, for a new motive power.

— Duponchel, Denis, of St. Omer, for an improved manner of making clocks strike the hours.

To Monie, Jean Baptiste, of St. Etienne, for the application of fibrous substances not hitherto used in silk tissues.

— Varlet, Francoise Joseph, of Chionville, for an improved stove.

— Brian and St. Ledger, of Paris, for a new method and mechanical means for manufacturing an artificial pezzolana.

— Saint Georges, Olivier, of London, for improvement in the process of communicating heat and generating steam.

— Chevalier, Victor, lamp maker, for an apparatus called by him Bdellaphore, for applying methodically leeches on all parts of the body.

— Ajac, Victor, of Lyons, for a frame for manufacturing shawls and other ornamented tissues.

— Durand Quentin, Charles Louis Kem, civil engineer, of Paris, for an economical apparatus, to prevent the escape of any effluvia from waterclosets.

— Rivière and Durand, of Paris, for a method of manufacturing white vinegar with spirits of wine and water.

— Jundt and Kolb, civil engineers, of Strasbourg, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue Choiseul, for an improved portable weighing machine.

— Tranchat, Francois, of Lyons, for an improved doubling machine, called by him *cannetière à demoiselles*.

— Bossange, Lachevardière, and Dussour, of Paris, for a mechanical kind of binding to be used for binding newspapers.

— Reboul, Pierre, of Cretz, for a distilling apparatus which produces spirits of wine of the required proof from the grapes themselves.

— Danré, Georges, of Paris, for a system of cocks to regulate the passage of gas necessary for the burners.

— Noriet, Louis, watchmaker, of Paris, for a double action barometer.

— Huet, Louis Jacques Onesium, of Paris, for a new kind of safety lock.

— Ringé, Augustin Henri, of Paris, for a new system of wrought iron work to be used in house building.

— Rieussec, Nicolas Mathieu, of Paris, for a new system of apparatus applicable to the sawing, weighing, and measuring of fire-wood delivered at the residence of the parties.

— Planche, Pierre, perfumer, of Paris, for a liquid soap of the Virgin Islands.

— Galy, Cazalat, of Versailles, for a gas microscope.

— Delestrade, Maxime, of Marseilles, for an improved method of manufacturing paper.

— Duvoir, Réné Marie Grégoire, of Paris, for a new calefier with external circulation.

— Beaudoin, of Saumur, lamp maker, for a process calculated to improve the quantity of light delivered by lamps.

— Dubrulle, Andre Narcisse, lamp maker, of Lille, for a new lamp called by him Dubrulle's lamp.

— Gonon and Bonnefoi, gun-makers, for a new manner of giving to all articles of iron a blue colour, which preserves them from rust.

— Chamie, Guillaume, coach-builder, Montpellier, for treble action springs, to be used in coach building.

—Thieulent, Jean Charles, blacksmith, of Arranches, for a remedy against the excess and reaction of water in undershot wheels,

— Duclos, Claude, mechanician, of Paris, for a new hydraulic propeller.

— Renaurd, Leopold, lamp-maker, for a counterpoise adapted to suspended lamps.

— Tabarié, Emile, for a new instrument called by him *onoscape centesimal.*

— Capdeville and Cailleux, Laberche, for the composition of a new kind of manure.

PATENTS GRANTED FOR IMPROVEMENTS MADE BY PATENTEES ON THEIR ORIGINAL INVENTION.

To William Newton, of London, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, 4, Rue Choiseul, for improvements in the manner of manufacturing pasteboard boxes.

— Brume, Chevalier, of Lille, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, 4, Rue de Choiseul, for improvements on his process of evaporation and distillation.

— Josselin, Jean Julien, of Paris, for a fifth addition to his improvements in the manufacturing of ladies' stays.

— Huard, Pascal, tallow-chandler, of Beaumont de Vriomte, for improvements on his two weaving frames, which throw the shuttle without any assistance from the workman.

— Mademoiselle Guntz, Francoise, for additions to her improved method of manufacturing candles.

— Perrier, Alexandre, of Paris, for addition to his improved telegraph.

— Don and Ragon, of Paris, for additions to their improved system of rail-roads.

— David, Pierre, mechanician, of Lyon, for additions to his improved machine for winding silk.

— Duplomb, Clément, of Lyon, for additions to his improved dressing plates treated by steam, for dressing all kind of woollen cloth.

— Duclusel and Daguet, pere et fils, of St. Etienne, for additions to their improved frame for making ribands with velvet flowers raised on them.

— Malignon, Louis Charles, of Roanne, for additions to his improved method of regulating the speed of coaches and waggons on rail-roads.

— Praget, Jean Pierre, of Brignolles, for a fourth improvement on his distilling apparatus.

— Lan, Charles Samuel, of Paris, for additions to his patent for an apparatus for condensing the vapour produced by the combustion of gas.

— Lecour, Louis Didier, for additions to his method of converting iron ore into malleable iron, without casting it, or using charcoal.

New Patents

SEALED IN ENGLAND,

1833.

To David Redmund, of Wellington Foundry, Charles-street, City-road, in the county of Middlesex, engineer, for his invention of certain improvements in steam carriages, which improvements are applicable to other purposes.—Sealed 28th October—6 months for inrolment.

To George Frederick Muntz, of Birmingham, in the county of Warwick, roller of metals, for his invention of an improved manufacture of boilers used for the purpose of generating steam.—Sealed 28th October—6 months for inrolment.

To Charles Joseph Hullmandel, of Great Marlborough-street, in the county of Middlesex, printer, for his invention of a certain improvement in the art of block printing, as applied to calico and some other fabrics.—Sealed 28th October—6 months for inrolment.

To Hugh Lee Pattinson, of Summer Hill Terrace, in the parish or parochial chapelry of Saint John, in the county of Northumberland, agent, for an improved method of separating silver from lead.—Sealed 28th October—2 months for inrolment.

To Jacob Frederick Zeitter, of New Cavendish-street, Portland-street, in the county of Middlesex, piano-forte

maker, for his invention of certain improvements on piano-fortes and other stringed musical instruments.—Sealed 1st November—6 months for inrolment.

To John Travis, the younger, of Shaw Mills, near Manchester, in the county palatine of Lancaster, cotton spinner, for his invention of certain improvements in machinery or apparatus for spinning wool, cotton, hemp, flax, or other fibrous materials.—Sealed 1st November—6 months for inrolment.

To William Brunton, of Charlotte-row, Mansion-house, in the city of London, engineer, for apparatus to facilitate and improve the excavation of ground and the formation of embankments.—Sealed 2d November—6 months for inrolment

To Dominick Stafford, of Duke-street, Adelphi, in the county of Middlesex, and late of the city of Paris, for an improvement in fuel, being a communication from a foreigner residing abroad.—Sealed 2d November—2 months for inrolment.

To Joseph Wass, of Lea, Derbyshire, millwright and engineer, for his invention of certain mechanical powers which may be made applicable to various useful purposes.—Sealed 5th November—6 months for inrolment.

To Richard Holme, of Kingston-upon-Hull, for his invention of improvments in apparatus and means of generating steam, and in other parts of steam engines, and also in the means of producing heat.—Sealed 7th November—6 months for inrolment.

To Henry Robinson Palmer, of Fludyer-street, Westminster, in the county of Middlesex, civil engineer, for an

improvement or improvements in the construction of arches, roofs, and other parts of buildings, and which improvement or improvements may also be applied to other useful purposes.—Sealed 7th November—6 months for inrolment.

To Peter Ewart, of Manchester, in the county of Lancaster, cotton-spinner, for his invention of a certain improvement or certain improvements in the spinning machine called the mule.—Sealed 9th November—6 months for inrolment.

To John Pace, of Bury St. Edmunds, in the county of Suffolk, watch and clock maker, being one of the people called Quakers, for certain improvements in, or additions to, horological machines.—Sealed 14th November—6 months for inrolment.

To Robert William Brandling, of Low Gosforth, in the county of Northumberland, Esq., for improvements in applying steam and other power to ships, boats, and other purposes.—Sealed 19th November—6 months for inrolment.

To John Cooper Douglas, of Great Ormond-street, in the county of Middlesex, Esq., for certain improvements in the construction of furnaces for generating heat, and also in the construction of apparatus or vessels for applying heat to various useful purposes.—Sealed 19th November—6 months for inrolment.

To John Cooper Douglas, of Great Ormond-street, in the county of Middlesex, Esq., for certain improvements which prevent either the explosion or the collapse of steam and other boilers, from an excess of internal or external pressure.—Sealed 19th November—6 months for inrolment.

To Marcel Roman, of St. Michael's Alley, Cornhill, in the city of London, merchant, for certain improvements

in, or additious to, apparatus or methods employed in throwing or winding silk or other threads.—Sealed 19th November—4 months for inrolment.

To Barthelemy Richard Comte de Prédaval, of Leicester-place, Leicester-square, in the county of Middlesex, engineer, for an engine for producing motive power, applicable to various purposes.—Sealed 19th November—6 months for inrolment.

To Stephen Perry, of Wilmington-square, in the parish of St. James, Clerkenwell, in the county of Middlesex, gentleman, Edward Massey, sen. of King-street, in the same parish, watchmaker, and Paul Joseph Gauci, of Charles-street, Middlesex Hospital, artist, for certain improvements in pens and pen-holders.—Sealed 19th November—6 months for inrolment.

To Daniel Ledsam and William Jones, both of Birmingham, in the county of Warwick, screw manufacturers, for their invention of certain improvements in machinery to be used in the manufacture of pins and needles.—Sealed 21st November—6 months for inrolment.

To John Cooper Douglas, of Great Ormond-street, in the county of Middlesex, Esq., for certain improvements for depriving vegetable juices and fermented and distilled liquids of their acid qualities, also of their colouring matter and essential oils.—Sealed 21st November—6 months for inrolment.

CELESTIAL PHENOMENA, FOR DECEMBER, 1833.

D.	H.	M.	
1	0	0	Clock after the ☉ 10 m. 43 s.
	—		☉ rises 7h. 45m. sets 3h. 53m.
	—		☽ rises 8h. 2m. P. M. sets 11h. 36 m. A.M.
	—		☽ passes the mer. 16 h. 26 m.
3	0	0	☿ in the ascending node.
4	8	30	☽ in □ or last quarter.
4	9	0	☽ in Perige.
5	0	0	Clock after the ☉ 9 m. 7s.
	—		☉ rises 7h. 51m. sets 3h. 51 m.
	—		☽ rises 0 h. 3 m. A. M. sets 1 h. 32 m. P.M.
	—		☽ passes the mer. 19 h. 55 m.
	12	0	♃'s first sat. will emerge.
	17	55	☽ in conj. with ♄ long. 8. in Libra. ☽ lat. 5. 13. N. ♄ lat. 2.16. N. diff. of lat. 2. 57.
7	0	0	Mer. R. A. 17 h. 14 m. dec. 21. 59. S.
	—		Ven. R. A. 15h. 26 m. dec. 17. 27. S.
	—		Mars R. A. 16 h. 9 m. dec. 21. 11. S.
	—		Jup. R. A. 1 h. 38 m. dec. 8. 45. N.
	—		Sat. R. A. 12 h. 37 m. dec. 1. 32. S.
	—		Georg. R. A. 21 h. 28 m. dec. 15. 43. S.
	—		Vesta R. A. 20 h. 54 m. dec. 22. 4. S.
	—		Juno R. A. 17 h. 5 m. dec. 12. 49. S.
	—		Pallas R. A. 9 h. 3 m. dec. 24. 41. S.
	—		Ceres R. A. 10 h. 29 m. dec. 19. 49. N.
	6	29	♃'s first sat. will emerge.
8	10	0	☿ in perihelio.
	18	0	☉ in conj. with ☿
9	20	56	☽ in conj. with ♂ long. 4. in Sagitt. ☽ lat. 2. 43. N. ♂ lat. 11 S. diff. of lat. 2. 54.
10	0	0	Clock after the ☉ 6m. 55s.
	—		☉ rises 7h. 57m. sets 3h. 49m.
	—		☽ rises 6 h. 44 m. A.M. sets 3 h. 31 m. P.M.
	—		☽ passes the mer. noon.
11	7	12	Ecliptic conj. or ● new moon.
12	13	56	♃'s first sat. will em.
14	8	25	♃'s first sat. will emerge.
15	0	0	☿ in conj. with ♀ long. 3. in Sagitt. ☿ lat. 2. 45 N. ♀ lat. 0. 59. N. diff. of lat. 1. 46.
	—		Clock after the ☉ 4 m. 33 s.
	—		☉ rises 8 h. 1 m. sets 3 h. 49 m.

D.	H.	M.	
15	0	0	☽ rises 11 h. 20 m. A.M. sets 7 h. 56 m. P.M
	—		☽ passes the mer. 3h. 40 m.
17	23	0	☽ in Apoge.
19	0	0	☿ Stationary near m in ♏.
	—		☿ in conj. with ♀ long. 8. in Sagitt. ☿ lat. 2. 54. N. ♀ lat. 0. 50. N. diff. of lat. 2. 4.
	5	31	☽ in □ or first quarter.
20	0	0	Clock after the ☉ 2 m. 5 s.
	—		☉ rises 8h. 5 m. sets 3h. 51m.
	—		☽ rises 1 h. 1 m. P. M. sets 0 h. 30 m. A.M.
	—		☽ passes the mer. 7 h. 12 m.
21	0	0	♃ Stationary near o in ♓
0	2	17	☽ in conj. with ♃ lon. 25. in Aries. ☽ lat. 4. 54. S. ♃ lat. 1. 18. S. diff. of lat. 3. 36.
	10	21	♃'s first sat. will emerge.
	12	36	☉ enters ♑
23	4	50	Jupiter's first sat. will emerge.
25	0	0	Clock before the ☉ 0 m. 25s.
	—		☉ rises 8h. 7m. sets 3h. 53m.
	—		☽ rises 2 h. 57 m. P. M. sets 6 h. 19 m. A. M.
	—		☽ passes the mer. 11 h. 9 m.
26	0	0	☽ eclipsed visible (see note).
	9	30	Ecliptic oppo. or ○ full moon
27	0	0	♀ in conj. with ♂ lon. 18 in Sagitt. ♀ lat. 0. 31. N. ♂ lat. 0. 23. S. diff. of lat. 54.
	—		Mer. R. A. 16 h. 48 m. dec. 20. 17. S.
	—		Ven. R. A. 17 h. 11 m. dec. 22. 27. S.
	—		Mars R. A. 17 h. 11 m. dec. 23. 22. S.
	—		Jup. R. A. 1 h. 37. dec. 8 45. N.
	—		Sat. R. A. 12 h. 41 m. dec. 1. 54. S.
	—		Georg. R. A. 21 h. 31 m. dec. 15 28. S.
	—		Vesta R. A. 21 h. 31 m. dec. 19. 27. S.
	—		Juno R. A. 17 h. 34 m. dec. 13. 14. S
	—		Pallas R. A. 9 h. 6 m. dec. 26. 35. S.
	—		Ceres R. A. 10 h. 41 m. dec. 20 15. N.
28	12	17	♃'s first sat. will emerge.
29	0	0	☿ elong. max. W. 22. 32.
30	0	0	Clock before the ☉ 2m. 52s
30	19	0	☉ in perigee.
31	19	0	☉ and ♄ in □

ECLIPSE OF THE MOON.

December 26th, an Eclipse of the Moon, visible at Greenwich, beginning 7h. 42m. 46s. P.M.; beginning of total darkness 8h. 43m. 7s.; end of total darkness 10h. 20m. 56s.; end of eclipse 11h. 21m. 31s. mean time; Digits eclipsed 20° 12′ from the Southern side of the Earth's shadow.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR OCTOBER AND NOVEMBER, 1838.

1838.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.	1838.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
Oct.						Nov.					
26	58	41	29,50	29,39		11	54	43	30,07	30,00	
27	60	37	29,66	29,61		12	49	36	30,16	30,11	
28	59	37	29,70	29,60	,15	13	40	39	30,17	Staty.	
29	62	35	29,76	29,70		14	40	25	30,11	30,09	
30	61	39	29,97	29,89		15	42	29	30,02	29,90	
31	54	37	29,98	29,91		16	49	31	29,89	29,82	
Nov.											
1	61	42	29,89	29,72	,025	17	51	40	30,11	30,03	
2	55	39	29,96	29,80		18	54	42	30,21	30,14	
3	49	37	29,93	29,81	,025	19	55	45	30,18	30,12	
4	49	27	30,14	30,02		20	51	34	30,04	30,00	
5	54	27	30,21	30,05		21	53	42	29,90	29,82	
6	55	39	29,98	29,94	,075	22	52	40	29,72	29,64	
7	47	36	29,82	20,68		23	49	39	29,67	Staty.	,225
8	48	29	29,80	29,64	,875	24	47	29	29,62	29,50	
9	49	21	29,99	29,87		25	28	41	29,79	29,55	,65
10	52	41	29,96	29,93							

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 2 N.
Longitude 3 51 West of Greenwich.

THE

London

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Recent Patents.

To WILLIAM HENSON, *of the city of Worcester, lace-manufacturer, for his invention of certain improvements in machinery for manufacturing bobbin net lace.*—[Sealed 26th December, 1832.]

THIS invention consists in a novel arrangement of mechanism for making bobbin net or twist lace, in which there is a combination of the contrivances employed in those constructions or principles of machinery for making lace denominated single tier and double tier.

In this improved machine a single tier of bobbins and carriages which conduct the warp threads, are, by means of fluted rollers, made to vibrate to and fro upon circular

bolts without shogging; and a double tier of carriages and bobbins conducting the weft or traverse threads, are moved to and fro on other circular bolts or circular combs below the former range of bolts; which last mentioned double tier of carriages are actuated by driving bars, and are made to shogg for the purpose of effecting the traverse.

In the accompanying drawings (see Plate XIV.) fig. 1, is a view of the back of the improved machine complete; and fig. 2, is a transverse section of the same, taken through the machine toward the left hand end of the former.

The single tier of bobbins and carriages which conduct the warp threads are represented at *a, a, a,* vibrating on the circular bolts *b, b,* the under parts of these carriages being formed into teeth or indentations, which are acted upon by two fluted rollers *c, c.* The lower or double tier of bobbins *d, d, d,* carrying the weft or traverse threads, move on the circular bolts *e, e,* below, or on combs placed in the same situation, the whole number of bobbins *d,* in the double tier being equal to those of the single tier *a.*

The rollers *c, c,* are driven by a vibrating sector rack *f, f,* the teeth of which take into pinions on the ends of the rollers *c, c,* and hence as the sector racks at each end of the machine swing upon their pivots, the whole tier of bobbins and carriages *a,* pass to and fro upon the range of circular bolts *b, b,* through the weft threads, the lower or double tier of bobbins or carriages being at the same time moved to and fro on the lower range of circular bolts *e, e,* by means of driving bars *g, g,* actuated by the connecting links *h, h,* and the rocking levers *i, i.*

In place of ordinary guides for directing the weft threads, there are a series of bent points *j, j,* (more particularly described hereafter) and from between these bent points or guides *j, j,* the threads proceed up to the face bar *k,* between the taking up points *l, l,* where net is formed, and

which is progressively drawn up and wound round the work beam or roller *m*.

The situations of the operative parts of the machine having been now pointed out, and which will be generally understood by lace makers, I proceed to describe the mechanism by which the same are actuated.

The main shaft of the machine is seen at *n*, *n*, which is driven by a band and rigger, as usual. Upon this shaft are fixed the excentric wheels *o*, *o*, which are embraced by the clips *p*, *p*; to the upper part of each of these clips is attached a vertical rod *q*, which rods are connected by joints to the right angled levers *r*, *r*, and these levers at their upper ends are also by joints connected through the links *s*, *s*, to the vibrating sector racks *f*, *f*. Hence at every half rotation of the shaft *n*, and excentric *o*, the sector rack *f*, will make one swing, which will give sufficient rotary action to the rollers *c*, *c*, to drive the tier of bobbins and carriages *a*, along the bolts from back to front, and the other half rotation of the shaft and excentric will in like manner cause the sector rack to vibrate and to drive the tier of bobbins and carriages back again along the bolts from front to back of the machine, three of which vibrations of these warp bobbins and carriages *a*, are necessary to the formation of every range of half meshes of the net.

Upon the main shaft *n*, there are also affixed the toothed wheels *t*, *t*, taking into the larger toothed wheels *u*, *u*, which are mounted above upon short axles *v*, at each end of the machine. These short axles also respectively carry a heart wheel *w*, the periphery of which acts against two pins or rollers in the rocking levers *i*, *i*, for the purpose of working those rocking levers and driving bars *g*, *g*, and the double tier of bobbin carriages *d*, *d*, that conduct the weft threads.

As the diameters of the wheels *u*, are three times that of

the wheels *t*, the heart *w*, will perform one revolution only to three of the excentric *o*.

The form of the heart wheel is such that in two opposite parts of its rotation it will pass through a twelfth of its circuit on a dead run, that is, without moving the levers *i*, *i*, the carriages *d*, *d*, at that time remaining stationary in the middle of the machine, and the rocking levers *i*, *i*, standing perpendicularly, as in fig. 2; but during the operating parts of each half rotation of the heart wheels, the rocking levers are moved to the right or left, and with them the driving bars *g*, *g*, which push the double tier of bobbins and carriages *d*, *d*, into the gates of one range of the bolts *e*; and on the heart wheel coming again to the dead run, the bobbins and carriages are brought back to their former stationary situations in the middle of the machine. The other half rotation of the heart wheel effects a similar movement of the double tier of bobbins and carriages *d*, *d*, driving them into the gates of the opposite range of bolts *e*, and then bringing them back to their stationary position in the middle, as before; the entire rotation of the heart wheel having produced two vibrations of the double tier of weft bobbins *d*, *d*, in the space of time that six vibrations of the single tier of warp bobbins *a*, have taken place, which are the evolutions of the bobbins necessary to produce one range of perfect meshes of the lace net.

It is, however, necessary to observe that during the time these evolutions have been going on, the lower tier of bolts *e*, *e*, have each been shogged or slidden laterally to the right and left, the one set of bolts during the formation of the first range of half meshes, the other set during the formation of the second range of half meshes for the purpose of effecting the traverse of the carriages *d*, *d*, and producing the crossing of the weft threads at the tops and bottoms of the meshes.

The particular object of causing the double tier of carriages *d, d,* to remain stationary in the middle of the machine at intervals is, that they may be forced asunder prior to the shogging of the bolt bars, and kept separate during that operation; which is effected by the occasional rising of a bevel edged bar *x*, extending along the middle of the machine between the two driving bars *g, g,* and supported at the ends in slotted brackets affixed to the swinging pieces which carry the driving bars.

At the under parts of the legs of the bar *x*, which slide up and down in the slotted brackets, there are anti-friction rollers bearing upon the upper edges of the levers *y*, at each end of the machine, the under edges of these levers *y*, being supported by the truck rollers *z, z,* fixed in the side of the heart wheel *w*. When the two truck rollers *z, z,* stand in a perpendicular position, as in fig. 2, the levers *y*, are raised, and, consequently, the bar *x*, is lifted up as shown, at which time the bevelled edge of this bar forces the carriages *d, d,* apart, while one of the circular bolt bars *e*, is shogged, or slidden a distance laterally equal to one gate of the bolts; but as the heart wheel goes round, the levers *y*, descend, and the separating bar *x*, falls in the slotted brackets to its bearing. Immediately after this the tier of carriages *d*, are, as before, all driven from the range of bars last shogged into the gates of the opposite range, the shogged bolt bar, thus emptied of its bobbins and carriages, sliding back again to its dead stop; and after this the double tier of carriages are, as before, brought to their quiescent situation in the middle of the machine, having, by the shog of the bolt bar, been shifted laterally or traversed into other gates of the circular bolts, and one half of the mesh of net completed. Now, the bevel edged bar *x*, rises again for the purpose of separating the carriages, and the shogging of the other range of bolts, and

the subsequent movements of the double tier of bobbins, as described, takes place for the completion of the range of meshes in the net.

It remains now to describe the form, object, and movements of the bent points *j, j*, which, as before stated, act as guides for conducting the threads from the double tier of bobbins *d, d*, up to the face bar *k*, and taking up points *l, l*; for the better illustration of which these guide points are drawn as upon a larger scale in figs. 3, 4, and 5.

These guide points are formed of steel wires, flatted on their sides, and bent over in an angle near their ends; they are placed side by side in rows, twice the number in a given space to that of the circular bolts below, which points are fastened into lead in the ordinary way of setting guides and points for lace machinery. Fig. 3, represents one of the leads holding a series of the bent points as it would appear on its inner side, and fig. 4, is an edge view of the same; *a*, are the points; *b*, the lead into which they are fixed, and *c*, a flat plate of brass screwed in front for the purpose of supporting the threads and preventing them from catching against the ends of the bolts, which covering of the stems leaves only the bent ends of the points open. These leads, of course, it will be understood, are screwed to the guide bars as at *j, j*, fig. 2, extending the whole length of the working part of the machine, both at back and front.

Fig. 5, is a section of the two rows of guide points affixed to the guide bars, and standing in the same positions as in the machine; *d, d*, represents the two series of weft threads passing upwards from the double tier of bobbin carriages, as shown in fig. 2. The threads of the respective series of bobbins in the double tier, it will be seen, stand back in the spaces between the guide points on each side, which is their situation at the time that the double tier of

carriages are separated in the middle of the machine, and when the heart wheel is passing the dead run, as described, at which time one of the sets of guide points *j*, shogs laterally to the extent of two gates in the same direction and to the same extent of space as the corresponding tier of bobbins and carriages *d*, and range of circular bolts *e*, immediately below, which is for the purpose of traversing the weft threads; and the points *l*, now take up and form the range of meshes at the face bar *k*, and when the whole of the double tier of bobbins and carriages *d, d*, have been driven into the gates of one range of circular bolts *e*, as described, having passed the threads over from one set of the guide points into the previously unoccupied spaces between the points of the opposite range, then the empty range of guide points shogs back again to its stop in the same way as the corresponding bolt bar below; and that range of guide points which now hold all the weft threads shog also in the same direction, but only the distance of one gate, the double tier of carriages passing as before into their quiescent situation in the middle, which movements of the weft enables the threads of the single tier of warp bobbins, by their successive vibrations, to lap round the weft threads and produce the twist.

Having now described the construction of my improved machine, and the principal movements of the operative parts, which will be well understood by lace makers, I do not consider it necessary to go into a further detail of the parts and movements, excepting in reference to the forms of the cams or rack wheels, commonly called the Dawson's wheels, which are placed at the end of the machine, acting against the ends of the bars which carry the guides *j, j*, and the bars which carry the bolts or combs *e, e*, of the double tier of bobbins and carriages *d, d*.

The forms of these wheels are set out in diagrams at fig. 6,

A, being the wheel for working the front circular comb bar of the double tier; B, that of the back circular comb bar; C, the wheel for working the front guide bar; D, that for the back guide bar. These wheels are all fixed upon a transverse horizontal shaft at the end of the machine, and the points of contact of all these wheels which are in operation at the time that the heart wheel is passing its dead run, is marked upon each wheel by a star (*).

Lastly, let it be understood, that my claim of invention consists, first, in the construction and adaptation of a double tier of bobbins and carriages in a lace-making machine constructed upon the single tier principle, the one set of bobbins and carriages conducting the warp threads, the other the weft threads; or the adaptation of an extra tier of bobbins and carriages to any construction of machinery for making lace, whereby the warp threads and weft threads are both worked by moveable bobbins and carriages; secondly, in the working of a single tier of bobbins and carriages solely by a pair of fluted rollers or rotary bars, with leaves for the purpose of producing the vibrations of the bobbins and carriages from one range of gates to the other range without interruption; thirdly, in the adaptation of bent pointed guides, or fine toothed racks, for directing, dividing, and traversing the threads; and, fourthly, in the employment of a longitudinal bar, or bevelled edge, for separating the double tier of bobbins and carriages as described.—[*Inrolled in the Rolls Chapel Office, June,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To Andrew Ure, *of Charlotte-street, in the parish of St. George, Bloomsbury, in the county of Middlesex, doctor of medicine, for his invention of an improved apparatus for evaporating syrups and saccharine juices, which is also applicable to other purposes.*—[Sealed 20th June, 1833.]

"I, the said Andrew Ure, do hereby declare the nature of my said invention for evaporating syrups and saccharine juices, which is applicable also to other purposes, to be a chemical apparatus wherein certain chemical menstrua are made to serve as agents for regulating and modifying the operation of caloric or heat upon various forms of matter; and whereby the influence of high temperatures on these forms of matter may be obtained in definite degrees without the accidents and dangers to which steam and oil as media of heat are liable. This combination of chemical menstrua, with suitable vessels for containing and applying them, I denominate my improved apparatus.

"First, I fix one pan within another, so as to leave an intermediate space between the two pans, into which space I put my hot bath liquid medium, consisting of a strong solution of caustic potash, or caustic soda, or of a mixture of these two alkalies. The purer the said simple or compound alkaline solution is, so much the better, but it will form a good calorific medium though it may contain a little carbonated alkali, neutra-saline matter, or other impurity. When the inner pan has the surface of its bottom, or of its bottom and sides, amplified by corrugation with angular or curvilinear ridges and furrows, it constitutes the form of the double pan apparatus, which I prefer for evaporating syrups, saccharine juices, and, in general, all liquids which require to be heated under a regulated tem-

perature, or are injured by exposure in a single pan to the heat of a naked fire.

"A double pan of this kind, covered with a proper capital, will constitute an excellent alembic for the distillation of fermented worts or wash, especially those containing rye. The bath space of the said double pan should be provided with a safety tube for discharging any redundant steam which may occasionally proceed from the medium by undue firing. The upper extremity of this tube should terminate in a water trap, or water valve, so as to cut off the open communication between the bath and the atmosphere, because the carbonic acid in the air would eventually carbonate the alkaline solution, and impair its properties as a liquid bath medium.

"To each double bath pan I attach one or more thermometers, having their bulbs plunged into the medium, in order to show its temperature; and as the boiling temperature of the alkaline solution depends upon its states of dilution, I regulate that temperature by introducing a little water into the bottom or centre of the bath (through a perforated hole) plunged into it, and connected at its top with a funnel or cistern of any kind.

"To ensure permanency to the constitution of the alkaline bath, the water valve, or water trap cistern, attached to the end of the safety pipe, above specified, should be charged with water mixed with lime, kept in a milky state by occasional agitation.

"The said medium may also be applied to evaporation, to oven heating, and to other purposes where a definite temperature is wanted, by heating the alkaline solution in a separate vessel, and causing it to circulate through tubes or cases, of any suitable form, for the communication and distribution of the calorific energy.

"The said separate vessel should be connected with a

safety pipe, and furnished with a thermometer, and with a tube for supplying water of dilution when needed to regulate the temperature.

"I also propose, in certain cases, to employ sulphuric or phosphoric acid, either alone or mixed, as hot bath mediums, the vessel and conduits containing these liquid acids being made of a substance not corrodible by them, and furnished with safety tubes, thermometers, and water-supplying pipes for dilution.

"I claim as my invention, 1st, the application of a strong solution of caustic alkali, as a bath to an evaporating pan or still, with a corrugated bottom; 2d, I claim the use for the said alkaline caloric medium of a water trap cistern charged with milk of lime, attached to the end of the safety steam pipe; 3d, I claim the applieation of the said alkaline solution either as a bath to the external surface of a plain pan, or as conducted from a boiler through pipes and conduits, in order to apply regulated heat to various purposes; 4th, I claim the application of sulphuric and phosphoric acids, or mixtures of them, as baths or mediums for transmitting heat at definite temperatures."—[*Inrolled in the Rolls Chapel Office, December*, 1833.]

Specification drawn by the Patentee.

To JONATHAN HAYNE, *of the parish of St. James, Clerkenwell, in the county of Middlesex, silversmith, for his having invented certain improvements in the mode or method of making or manufacturing metal spoons and other articles.*—[Sealed 25th May, 1833.]

THESE improvements in the mode or method of making or manufacturing metal spoons and other articles, apply to a

process by which silver and other metal spoons, ladles, and forks, are manufactured by machinery with greater facility, and in a superior manner, than has hitherto been effected by manual labour.

In the manufacture of these articles I employ a stamping machine with dies, in which the hammer is raised to a height between guides, and is let fall by a trigger, and I prefer that the protuberant parts of the die should be fixed on the stationary block or bed of the stamping machine, and the hollows, or counter part, of the die be attached to the falling hammer.

The peculiar feature of improvement in this manufacture consists in producing the spoon, ladle, or fork perfect at one blow in the stamping machine, and requiring no further manipulation of shaping, but simply trimming off the barb or fin, and polishing the surface, to render the article perfect and finished.

Heretofore, in employing a stamping machine or fly press for manufacturing spoons, ladles, and forks, it has been the practice to give the impressions to the handles and to the bowl or prongs, by distinct operations of different dies, and after having so partially produced the pattern upon the article, the handles had to be bent and formed by the operations of filing and hammering.

By my improved form of dies having curved surfaces and bevelled edges, which allow of no parts of the faces of the die and counter die to come in contact, I am enabled to produce considerable elevations of pattern and form, and to bring up the article perfect at one blow with only a slight barb or fin upon its edge.

In the accompanying drawings, (see Plate XIV.) fig. 10, is the lower, or bed, die for producing a spoon, seen edgewise; fig. 11, is the face of the upper or counter die corresponding; fig. 12, is a section, taken through the middle

of the pair of dies, showing the space in which the metal is pressed to form the spoon.

To manufacture spoons, ladles, or forks, according to my improved process, I first forge out the ingot into flat pieces of the shape and dimensions of the die of the intended article; and if a spoon or ladle is to be made, I give a slight degree of concavity to the bowl part, and, if necessary, bend the back, in order that it may lay more steadily, and bend more accurately upon the lower die; if a fork, I cut or otherwise remove portions of the metal at those parts which will intervene between the prongs, and, having thus produced the rude embryo of the intended article, I then scrape its entire surface clean, and free from oxidation-scale or fire-strain, when it is ready to be introduced into the stamping machine.

I now fix the lower die in the bed of the stamping machine shown at *a, a*, in the elevations, figs. 13 and 14, and I also fix in the hammer *b*, the upper or counter die *c*, and accurately adjust them both, so that they may exactly correspond when brought together. I then place the rudely-formed article above described upon the lower die, and having drawn up the hammer to a sufficient elevation by a windlass and rope, or other ordinary means, I then let go the trigger, and allow the hammer with the counter die to fall upon the under die, on which the article is placed, when by the blow thus given to the metal, the true and perfect figure and pattern of the spoon, ladle, or fork, is produced, and which, as before said, will only require the removal of the slight edging of barb or fin, and polishing, to finish it.

On striking the blow, in the operation of stamping the article, the hammer will recoil and fly up some distance, and if allowed to fall again with reiterated blows, would injure both the article and the dies; therefore, to avoid this inconvenience, I cause the hammer on recoiling to be caught

by a pair of palls locking into racks on the face of the standards, seen in figs. 13 and 14. In fig. 13, the hammer *b*, of the stamping machine, is seen raised and suspended by a rope attached to a pair of jointed hooks or holders *d*, *d*, the lower ends of which pass into eyes *e*, *e*, extending from the top of the hammer. When the lever or trigger *t*, is drawn forward, as in fig. 14, the two inclined planes *g*, *g*, on the axle *h*, press the two legs of the holders *d*, *d*, inward, and cause their hooks or lower ends to be withdrawn from the eyes *e*, *e*, when the hammer instantly falls, and brings the dies together: such is the ordinary construction of the stamping machine.

On the hammer falling from a considerable elevation, the violence of the blow causes it to recoil and bound upwards, as before-mentioned; it, therefore, becomes necessary to catch the hammer when it has rebounded, in order to prevent the dies coming again together; this is done by the following mechanism:—

Two latch levers *i*, *i*, are connected by joints to the upper part of the hammer, and two pall levers *k*, *k*, turning upon pins, are mounted in the bridge *l*, affixed to the hammer. Two springs *m*, *m*, act against the lower arms of these levers, and press them outwards for the purpose of throwing the palls at the lower ends of the levers into the teeth of the ratchet racks *n*, *n*, fixed on the sides of the upright standards.

Previously to raising the hammer, the upper ends of the pall levers *k*, are drawn back, and the latches *i*, being brought down upon them, as in fig. 13, the levers *k*, are confined, and their palls prevented from striking into the side racks; but as the hammer falls, the ends of the latches *i*, strike upon the fingers *o*, *o*, fixed to the side standards, and liberate the palls, the lower ends of which, when the hammer rebounds after stamping, catch into the

teeth of the racks, as in fig. 14, and thereby prevent the hammer from again descending.

Lastly, I wish it to be understood that though I have stated that I forge from the ingot, in the first instance, the shapes of metal of which spoons, ladles, and forks are to be made by my improved process, yet I do not intend to confine myself to preparing the metal shapes by forging, as, under some circumstances, I may find it convenient to produce the rude form of the article by rolling plate metal, or by casting it in a mould.—[*Inrolled in the Rolls Chapel Office, November,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To LOUIS PAUL LEFORT, *late of Grand Couronne, near Rouen, in the kingdom of France, but now residing in Cornhill, in the city of London, merchant, for an invention communicated to him by a person residing abroad, for certain improvements in machinery or apparatus for making or manufacturing lace, commonly called bobbin net.*—[Sealed 17th May, 1833.]

THESE improvements in machinery for manufacturing bobbin net lace, apply to that particular construction of lace machinery commonly called or known by the name of the Levers principle, and consist, first, in a peculiar apparatus for separating the bobbin carriages at those periods of the movements of the machine when the carriages are to be divided into two rows; secondly, a peculiar apparatus for moving the point bars which take up the half meshes of the net as they are formed; and, thirdly, the peculiar machinery and means through which the

general movements of the machine are effected by a rotary impelling power.

In the accompanying drawings (see Plate XV.) these improvements are shown in connexion with the original machinery, and their several constructions and modes of adaptation will be fully understood by reference to the figures in those drawings, and the following description thereof.

Fig. 1, is a front elevation of a Levers machine, with the improved parts connected thereto; fig. 2, is an elevation of the right hand end of the machine; fig. 3, is an elevation of the back of the framing, with such of the improved parts of the machinery mounted thereon as would be seen behind; fig. 4, is a transverse section taken through the machine, showing the connexion of the new with the old parts, and the way in which they are made to effect the several evolutions through a main rotary shaft, driven by steam or any other motive power.

Figs. 5 and 6, are sectional representations of the interior or working parts of the mechanism, in two different positions, which are drawn on a larger scale for the purpose of showing the separation of the bobbin carriages more perfectly, and also the operations of the catch bars, which move the carriages to and fro, in the gates of the combs in the ordinary operations of a Levers machine: the several letters referring to corresponding parts of the mechanism in all the figures.

Rotary power being communicated to the main shaft *a, a, a,* at the back of the machine, the cranks *b, b,* upon that shaft actuate the joints or vibrating arms *c, c,* carrying the working parts of the mechanism, and through the agency of the bent levers *d, d,* give those reciprocating movements requisite in putting the machinery into effective operation.

As the construction and mode of working a Levers

machine is well understood by lace makers, it will be unnecessary to describe it further than to show the connexion of the improvements with the original machinery.

The landing bars of the ordinary Levers machine are represented in the sections at *e*, *e*, the comb bars at *f*, *f*, and the catch bars at *g*, *g*, which are all in their usual situations and are employed as heretofore. Beneath the catch bars, on each side, a series of fingers, hooks, or fetchers *i*, *i*, are applied, mounted upon additional longitudinal bars *k*, *k*, which I call the separating bars.

These separating bars *k*, *k*, are supported on pivots in bearings affixed to the landing bars, as shown in the front elevation fig. 1, and also in the sections figs. 5 and 6.

At one extremity of each separating bar *k*, there is an elongation or piece attached, which carries an arm *l*, (see fig. 1.) and from this arm extends a tooth *m*, (see the section figs. 5 and 6,) which acts against a cam or cut wheel *n*, fixed on the axle of the Dawson's wheels employed in lifting the catch bar and pusher bar in the ordinary Levers machine.

Instead of dividing the carriages by the advance of the pushers, as in the ordinary Levers machines, the series of fingers, hooks, or fetchers *i*, *i*, are made to fall down and take hold of the ribs of such carriages as are to be moved out on each side from the centre. The arms *l*, attached to the separating bars *k*, *k*, are so formed and situate that the tooth *m*, on each arm bears against the periphery of the cam or edge of the wheel *n*, as it revolves, and when the circular part of the wheel runs against the tooth *m*, the bar is raised, and the fingers are kept up free from the ears of the carriages, as shown in fig. 6; but as the wheel *n*, goes round when the notch, or excentric part of the wheel, comes under the tooth *m*, the tooth falls toward the axis

of the wheel, which causes the bar *k*, to tilt and to bring the series of fingers *i*, down into the notches behind the ears of the respective carriages on which they are intended to act, when the opening of the joints or vibrating arms *c*, *c*, moves the landing bars outward, and with them the series of fingers which separate the carriages by drawing them apart as shown in fig. 5.

Immediately after the fingers *i*, have fallen into the notches of the bobbin carriages, the pushers *o*, *o*, are, by the ordinary movements of the machine, projected forward into each of the alternate gates of the combs, where they act as guards, preventing, in any instance, two carriages being drawn out by one finger or fetcher as the carriages separate. The fingers, hooks, or fetchers *i*, *i*, having drawn the respective ranks of bobbin carriages out on each side, in the same way as the ordinary catch bars are used to do, on the closing again of the joints or vibrating arms *c*, *c*, the fetchers become pushers, forcing the carriages back toward the middle of the combs, when, on the separating bars rising and withdrawing the fingers, the catch bars instantly fall into the notches, and close all the carriages together into one uniform row, ready for the next movement.

For the better illustration of the form of the fetchers, figs. 7 and 8, are drawn upon a larger scale, showing one of the fetcher brasses with a series of fingers *i*, placed in a uniform range; fig. 7, is the edge or sectional view, and fig. 8, is the under side, or that surface of the brass which is placed in contact with the upper side of the separating bar *k*; figs. 9 and 10, represent similar fetcher brasses suited for a machine in which several narrow breadths of lace are to be made and connected at the selvages by a single thread; fig. 9, shows the separating brass for the back bar of the machine, and fig. 10, the corresponding

brass for the front bar, the former having two fingers united, the latter one finger removed, the object of which will be well understood by lace makers.

Fig. 11, represents the cut of wheels to be fixed on the horizontal shaft placed longitudinally near the end of the machine called the Dawson's wheels; A, is the ratchet by which the shaft and wheels are driven; B, is the wheel for working the pusher bar; C, is the wheel for working the separating bar (marked *m*, in the other figures;) D, is the wheel for working the catch bar. They are all placed in their relative positions to each other.

It may be necessary here to observe, in reference to shogging the turnagain bar in making breadths with this improved machine, that this lateral movement must take place when the carriages are returning toward the close, and immediately before they enter the warp threads, which will be determined by the position of the cam that gives the shogging movement.

The improved machinery which effects the taking up or working of the point bars, is actuated by the main rotary crank shaft *a*. Upon the crank shaft there is a star pinion *p*, of twelve teeth, connected by a chain with the star wheel *q*, of forty-eight teeth, and by the rotation of which shaft or pinion this star wheel is driven. On the axle of the wheel *q*, there is also a pinion of thirty teeth taking into a wheel *r*, of sixty teeth, on the upper shaft *s*, at the back of the machine, which shaft carries the cams that act upon the tail poles *v*, *v*, of the point bars. These cams are shown at *t*, *t*, in fig. 4, and also in two different positions in the auxiliary figures 12 and 13.

Let it be supposed that the cam *t* 1, in fig. 12, as it revolved in the direction of the arrows, had been acting against the anti-friction roller *u*, at the under side of the tail pole *v* 1, and consequently raised that tail pole, and de-

pressed the back point bar attached to the opposite end of the lever: when the highest point of the cam has passed the roller, the tail pole will fall down into the horizontal position shown in fig. 4, and the back points by that means will be made to take up the half meshes of the net. The other cam *t* 2, will now begin to act against the other tail pole *v* 2, and as it goes round will depress and then raise the front point bar in like manner.

In order that the points may be made to take up the meshes of the net with sufficient and regular tension, small curved hollow tappets *w*, attached to the cam shaft *s*, are, as the cam revolves, brought over the rollers *u*, by which means the tail poles that carry the rollers will be slightly depressed, and the points connected with their opposite ends be drawn up so as to produce the required tension. This tappet *w*, will be seen just coming into action with the roller *u*, of the tail pole *v* 1, in fig. 13. The other tappet when it comes up acts precisely in the same way on the tail pole *v* 2.

In the event of driving this machinery by steam or other motive power, a rigger is to be placed on the main shaft *a*, and which is to be actuated by a band leading from the first mover; but in driving the machinery by hand, a pair of equal wheels may be employed, the one fixed upon the crank shaft, the other turning in a suitable bearing with a winch or handle, and the two connected together by a chain or band, as shown in the end, vide fig. 2.

For the purpose of working the Dawson wheels which produce the shogging or lateral movements of the several bars, an excentric or cam wheel *x*, is fixed on the crank shaft, as shown in fig. 2. This excentric, as it revolves, works against two anti-friction rollers attached to a ring or hoop at the top of a vibrating lever *y, y, y,* and an arm *z*, extending from the top of the ring or lever, and

passed through guides, carries a click which takes into the ratchet wheel on the Dawson wheel shaft, and hence by the successive vibrations of the lever *y*, the Dawson wheels will be driven round, and the shogging of the bars be effected. I must further observe that the width of the fingers, hooks, or fetcher *i*, described above, should be made about wide enough to cover two combs and one carriage, which will prevent the liability of their retiring without taking the intended carriages with them.—[*Inrolled in the Rolls Chapel Office, November,* 1833.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM MALLET, *of Marlborough-street, in the city of Dublin, iron-manufacturer, for his having invented certain improvements in making or constructing certain descriptions of wheelbarrows.*—[Sealed 5th August, 1830.]

THE subject of this Patent is the manufacture of iron wheelbarrows. The inventor describes his mode of constructing wheelbarrows to be by first cutting pieces of sheet iron to the required shapes, and then bending up their edges or flanges, through which edges the parts forming the bottom and sides are fastened together by rivets or screws.

A frame to support the barrow is made of bars of wrought iron turned up on the edge in the form of a rebate, which gives great strength in proportion to the substance of the iron bar. This frame is intended to carry the axle of the wheel in front, and, being elongated behind, receives wooden handles, by which the barrow may be driven.

The form of the barrow, that is, whether shallow or deep, will depend upon the uses to which it is to be

applied. For excavators, miners, road-makers, brick-makers, and many other purposes, the barrow should be broad and shallow, but for farmers, gardeners, and others, a deeper shaped barrow will be most convenient.

It is recommended that small holes should be made in the bottom of the barrow in order to allow water to run through, otherwise the iron will soon become rusted, and the barrow fall to pieces.

There is no particular claim for any feature of novelty mentioned in the Specification, and we are at a loss to conceive in what the invention consists, as wheelbarrows made of iron have been in use here for many years, and, as far as we remember, made of plate and bar iron much in the way described.—[*Inrolled in the Inrolment Office, February,* 1832.]

To Joseph Harrison, *of Wortley Hall, in the parish of Tankersley, in the county of York, gardener, and* Richard Gill Curtis, *of the same place, glazier, for their having invented certain improvements in glazing horticultural and other buildings, and in sash bars and rafters.*—[Sealed 6th October, 1830.]

The improvement herein proposed consists in a mode of securing the panes of glass in the sashes of a green-house so that they shall present nearly an even surface.

Long ribs of wood, made flat on their upper edges, are to be fixed in the frames, and the panes of glass to be laid upon these ribs, the edges of the glass touching each other as near as possible. Putty, or some such cement, is to be laid as a bed to hold the edges of the glass on the sides, and to fill up the small spaces between them at their joints.

The panes are to lap over each other a very little, just sufficiently to prevent rain from running through; and the corners of the glass being cut off, they are to be secured by small screws fastened into the wood against the corners of the panes, leather collars or washers being placed under the heads of the screws to prevent them pressing too hardly upon the glass.

This is the whole matter of the invention: what are the improvements in the sash bars and rafters mentioned in the title we have not discovered.—[*Inrolled in the Inrolment Office, December,* 1830.]

To JAMES CHADLEY, *of Gloucester Street, Queen Square, in the parish of St. George the Martyr, Middlesex, surveyor, for his having invented certain improvements in making or forming bricks, tiles, and chimney bars, applicable to building or erecting the flues of chimneys.*—[Sealed 13th September, 1830.]

THE irregular angles and curves which frequently occur in the erection of chimneys and flues, have induced several persons to take Patents for bricks of peculiar forms, suited to those purposes. The subject of the present Patent has the same object.

Bricks are to be formed with flat surfaces at top and bottom, and angular on their outside, but curved within. Internal curves are to be bevelled to suit the turning, winding, or sloping of the flue or chimney, the object of which is, to render the flue or chimney, when built, smooth from the surface of the bricks alone.

When the surfaces of chimneys have been irregularly formed by the old modes of buildings, they may be ren-

dered smooth by coating them with tiles of the kind proposed by the Patentee, having rebated edges which lap over each other, and preserve an even surface on the outside.

The construction of the arch over a fireplace is proposed by the Patentee to be made by a cast-iron bow, with sloping back, and elevated front edge; the bow or bridge having ribs or ledges in it capable of receiving the edges of the bevelled bricks, of which that part of the chimney is to be constructed.—[*Inrolled in the Inrolment Office, March*, 1831.]

To WILLIAM DOBREE, *of Fulham, in the county of Middlesex, gentleman, for his having invented or found out an independent safety boat of novel construction.*—[Sealed 5th August, 1830.]

FROM a careful perusal of this Specification, we have not been able to understand the particular features of novelty in this independent safety boat. The Patentee says, that the novelty consists in separating that part which contains the passengers and crew from the hull, which are attached together by a self-supplying water ballast chamber. This vague description is further amplified by a statement, that an extra deck is formed within the hull, which is to be occupied by the passengers and crew; and that air vessels are to be placed in the lower parts.

From a very rude outline sketch which accompanies this Specification, we are led to presume that the portion of the boat which is to be occupied by the passengers and crew, forms a separate and independent vessel within the principle hull; but in what way they are connected together, or

by what means they are made capable of separation, does not appear. In the lower parts of the sketch there are circles drawn, which we are told represent air vessels, but to what portion of the vessel they are attached we know not.

Upon the whole, double hulls capable of separation, and air vessels to give buoyancy, have both been suggested before, we therefore do not perceive the novelty of the scheme, even if it had been explained in a more intelligible manner.—[*Inrolled in the Inrolment Office, January*, 1831.]

To Lieutenant Colonel LESLIE WALKER, C. B. *of Cumberland-street, Pentonville, in the county of Middlesex, for his invention of a machine or apparatus to effect the escape and preservation of persons and property in case of fire, or other circumstances.*—[Sealed 6th October, 1830.]

THE contrivance herein proposed for enabling persons to escape from the upper stories of houses when on fire, is a sort of crane to be affixed to the window frame of the house, from whence a basket or light box may be let down by a rope passed over pullies; the opposite end of the rope having a balance weight suspended to it as a counterpoise to the weight of the person descending.

Plate XIV, fig. 15, represents the window of a house, with the crane affixed thereto, and the basket or light wooden box covered with canvas suspended. Fig. 16, is a side view of the same; *a*, is a bar, affixed to the frame of the window, from which an arm extends to the cross piece *b*, and this is further supported by the standard *c*, resting at bottom on the window ledge. Two pullies are mounted

in the cross piece at *d, d*, over which the rope *e*, is passed; at one extremity of the rope the basket *f*, is suspended, and at the other end of the rope a balance weight.

When the person intending to descend, gets into the basket or box, if the counterpoise weight should not be sufficient to cause the load to descend slowly, the person may take hold of the check rope *g*, which is fastened to the crane, and allowing the rope to slip through his hands he may by means of the knots in the check rope descend as slowly as he pleases.—[*Inrolled in the Inrolment Office, April*, 1831.]

AMERICAN PATENTS.

(*From the Franklin Journal.*)

For *Machinery for Cleaning Fur;* Charles Lockwood and Ransom Lockwood, of Weston, and John Arnold, of Norwalk, Fairfield county, Connecticut.

The object in view is to separate the fur and hair from each other after they have been cut from the pelt. A machine is described which the Patentees say they have had in use with beneficial results, and they indicate different modes in which the same principle may be applied, resting their claim upon the principle of action, whether applied as they have done it, or in any analogous way, which produces the same effect.

The invention is founded on the principle that the barbs, or asperities, contained on hair, give to it a tendency, when

agitated, to travel back in such a way as will cause it to enter between the fibres of any kind of cloth, and to pass through it. A principle, in fact, upon which the process of felting is entirely dependent.

The machine which they use is an oblong box, supported on a suitable frame, the sides of the box are lined with tin, or otherwise so made that the fur will not adhere to it, whilst the bottom is made of cloth, into which the hairs are to be forced to pass. Within this boxr evolve a number of whippers, attached to shafts, which serve to agitate the fur, keep it hollow, and prevent it felting. The machinery by which the shafts are turned operates also upon the cloth bottom by a kind of twitching motion, alternately relaxing and straining it, which causes the hairs to enter and pass through it.

It is proposed sometimes to send the fur through a revolving machine, formed like the boulter of a flour mill, and covered with cloth, having whippers revolving in it, and beaters acting upon the outside of it, in order to produce a result analogous to that obtained from the twitching motion before spoken of. Other modes are pointed out, all of which are considered as mere examples of the many forms which may be given to the apparatus, whilst it remains essentially the same, the claim being to "the agitating in any manner the mixed mass of fur and hair, and causing their separation by the inherent and natural qualities of the hair when thus agitated in contact with the cloth."

For a *Lamp for burning Tallow, Lard, Beeswax, or other concrete oils;* Norman Rublee, Montpelier, Washington county, Vermont.

It is proposed to make the body of this lamp in the form of a common tumbler, with the cover, or upper part of it, convex. Tubes with wicks are fixed in its centre in the ordinary way, and within the body of the lamp there is a cup which is open at top, and may be about half the height of the shell, or external case of the lamp.

This cup is borne up by a spiral spring, so that its upper edge is kept in contact with the cover of the lamp; from the centre of this cup a wire, which may be of copper, ascends and passes through a hole in the centre of the burner to which the tubes are attached; this wire is to rise so high that the flame of the wicks may heat it, which heat descending down melts the concrete matter, being aided also by that portion which it communicates to the cup and wire spring to which it is attached.

When the lamp is to be filled, the wax, tallow, &c. in a melted state, is poured into it, so as not only to fill the cup, but the body of the lamp also. When the material is partly burnt out, and becomes too low in the cup to supply the wick, the wire heater is to be pressed, which causing the cup to descend, will again fill it, and, when the pressure is removed, the action of the spiral spring will restore it to its place.

The points depended on "are the construction of the cup, spring, and heater," by which "the great difficulty of the tallow's getting low, and beyond the influence of the heat, is avoided." This combination we believe to be new, although the heater alone is not so, a copper or other wire, having been frequently used to keep tallow, &c. in a melted state for burning in lamps.

For an improvement in the *Water Wheel;* James M'Connel, Shenango, Mercer county, Pennsylvania.

The Patentee claims, in the action of his wheel, the conjoint operation of three powers, all derived from the descent of the water; it is to be a horizontal reaction wheel, receiving the water on its upper, and discharging it on its lower side. There are to be eleven buckets, extending from the periphery of the wheel towards its centre, about one-half the semidiameter; the buckets are to be curved from the top to the bottom in such a way as to deliver the water advantageously in its exit. The wheel is, of course, to run in a penstock, with a suitable curbing, to direct the water. The buckets overlap about six inches at their outer ends, that is, a line drawn perpendicularly from the lower edge of one bucket would cut off about six inches of the contiguous bucket. Not only the number of the floats or buckets, but the precise dimensions of every part, are given; a detail into which it is not necessary for us to enter.

We are told that this wheel will run in back water with more facility than any other, and that it is particularly adapted to places where the head is low, and the wheel liable to be flooded. The three powers which act upon it are thus set forth by the Patentee; he says that the water issuing from the bottom of the wheel propels it upon the principle of reaction; that the water being let in at the upper side, and running with the wheel, and striking the buckets nearly at right angles, propels it upon the principle of percussion; and that the water in passing down through the wheel, acting on the inclined surface of the buckets, gives a third impulse on the principle of gravity. The claim is to the practical combination

of these three principles of percussion, gravity, and re-action, used at one and the same time.

We are unable to trace the particular and special coadjutorship of these three principles in this wheel, and could as readily ascribe them to several others; we are, however, so much inclined to resolve all these modes of action into gravity, and to view them as merely different methods of applying this property of matter, as not to acknowledge the employment of any other power in the propelling of water wheels. Reaction and percussion we esteem as the children of gravitation, and would never commend their employment when the fall of water is sufficient in height to enable the millwright to fill the buckets of an overshot, or pitch-back, wheel; that is, when it is necessary to husband power.

For an improvement in the *Process of Tanning Leather*; Edward Evans, Salem, Westmoreland county, Pennsylvania.

It is proposed to dispense with the use of lime, and likewise with the process of sweating, by one or other of which the hair is ordinarily removed in the preparatory process of tanning; and also to complete the operation in less than one-half the usual time. The patentee calls his improved mode, "the vegetable fermentative process of tanning."

Into each of four barrels is put a bushel and a half of chopped Indian corn, or other grain; or, in lieu of these, an adequate quantity of any vegetable matter, which will undergo the vinous fermentation, to produce which a suitable portion of scalding water and yeast are to be employed; when this process has commenced, the contents

are to be emptied into a vat prepared by being half filled with clean soft water; the ingredients are to be stirred, and the vat covered, so as to renew the fermentation. Hides which have been well soaked and fleshed are then to be put into the vat, and occasionally handled until the hair is loose, which, under proper management, will be in a few days. When they have been haired, and again fleshed, they are to be replaced in the fermenting liquor, and worked out in the course of a day or so. They are then prepared for handling in strong oose, into which a barrel of fermented liquor has been poured; after a week they are to be laid away in strong leaches, containing also a barrel of the like liquor.

The claim is to the applying the principle of vegetable fermentation in the manner described, throughout the whole process of tanning. Experience is the best tutor; if the process answers well, we have nothing, therefore, to say against it, although its theory may appear to be a little mystical.

For a *Machine to be used in the art of Blowing Glass;* Joshua Laird, Pittsburgh, Allegheny county, Pennsylvania.

The machine above-named is intended for blowing glass knobs for bureaus, and other detached pieces of glass which are blown in moulds; the main part of the invention consists in the application of a forcing or condensing pump to the blowing of articles of the foregoing description. A table of a suitable height has a top formed of a plate of cast iron, upon which are proper fixtures for sustaining the

mould into which the detached piece of glass is placed. The cylinder of the pump is secured vertically at one end of the table, and the air from it is conveyed through a leaden or other flexible pipe to a hole in the centre of the table, exactly under the mouth of the mould; a pipe or nozle of brass or other metal attached to the flexible tube, passes up into the glass to be blown, and is retracted when the operation is completed, it being attached to a jointed handle, fixed for the purpose below the table. The mould and its handles are made in the usual way, excepting a cap plate attached to the table, and which turns back upon a joint when the mould is to be removed. The centre of the under side of this plate is excavated so as to form the upper part of the mould, and is perforated so as to admit a pin to pierce the knob.

The claim is to the application of the pump in blowing of glass, and to the crown, or cap piece, as above described.

For *Clarifying Sperm and other Oils*; Ephraim C. Moss, City of New York.

The agent employed for clarifying oils of various kinds, is heat, applied through the medium of steam or boiling water in any suitable apparatus. The oil is to be put into a tin kettle, which fits into a copper or other boiler, by means of which it may be surrounded with boiling water or steam. A close cover is to be fitted on to the tin kettle, and openings are made for supplying water and oil, and also for the placing of a safety valve. Oil kept at a moderate heat in this way, will, it is said, be clarified in a

few hours, a portion of the foreign matter rising in scum, and another portion precipitating. During the process the rising scum is to be removed. The patentee states that one great advantage of his procedure is, that it can be followed at all times and seasons, whilst the refining of oil by exposure to air and the direct rays of the sun is restricted to fine weather, and a limited portion of the year.

This process admits of the use of caustic ley, sometimes employed, in which case the ley is to be thoroughly mixed with the oil before the heat is applied.

For a *Machine for Washing and Drying Clothes*; Thomas Pierce, Hartwick, Otsego county, New York.

The trough of this machine is triangular within, the horizontal cover forming one of its sides; the ends of the trough, which meet together at the bottom, form the other two sides of the triangle. A lever working on a fulcrum above the trough, and extending beyond its two ends, has two curved pieces morticed into it, which descend into the box, and pass through slots in its top; each of them is about a quadrant of a circle. Each of them has a flat board perforated with holes, fixed upon its lower end, and extending along the whole width of the box. When the lever is forced down at one end, the board upon its quadrant will have its face brought into contact with the opposite side of the triangular box, and so of the other end. The clothes placed in this trough, with a due portion of soap suds, are alternately squeezed by these boards against the opposite sides of the trough. This kind of action upon them is undoubtedly better than that of many other wash-

ing machines. What is called the *drying* part of the apparatus, is one which is a substitute for wringing. A square box perforated with holes receives the wet clothes, and a follower is brought down upon them by means of a rack and pinion.

There is no claim made, and how far the whole apparatus may be considered as new, we leave to the judgment of those concerned.

New Patents

SEALED IN ENGLAND,

1833.

To Henry Hardingham Leggett, of Fulham, in the county of Middlesex, gentleman, for certain improvements in the art of printing in colours.—Sealed 23d November—6 months for inrolment.

To Thomas Parsons, of Newport, in the county of Salop, gentleman, for certain improvements in locks for fastenings.—Sealed 3d December—6 months for inrolment.

To John Hall, of Breezes Hill, Ratcliffe Highway, in the county of Middlesex, sugar refiner, for certain improvements in filters for sugar and other liquids.—Sealed 6th December—6 months for inrolment.

To Joshua Wordsworth, of Leeds, in the county of York, machine maker, for certain improvements in ma-

chinery or apparatus for heckling flax, hemp, and other fibrous substances requiring such process.—Sealed 6th December—6 months for inrolment.

To Erust Wolff, late of Leeds, in the county of York, merchant, but now of Stamford Hill, in the county of Middlesex, gentleman, for a mode or modes of supplying stoves with heated air without bellows or blow pipe, being a communication from a foreigner residing abroad.—Sealed 7th December—6 months for inrolment.

To John Baptiste Constantine Forassa, of Newington Causeway, in the county of Surrey, gentleman, Paul Isaac Muston, of Austin Friars, in the city of London, merchant, and Henry Walker Wood, of the same place, merchant, for certain improvements in making or producing the pigment commonly known by the name of white lead or carbonate of lead.—Sealed 11th December—6 months for inrolment.

To Thomas Affleck, of the town of Dumfries, in the county of Dumfries, Scotland, merchant, for his invention of certain improvements in the means and machinery for deepening and excavating the beds of rivers, removing sand banks, bars, and other obstructions to navigation.—Sealed 11th December—6 months for inrolment.

To Riley Carr, of Sheffield, in the county of York, manufacturer, for his invention of certain improvements in machinery for cutting, cropping, and dressing woollen and cotton cloths.—Sealed 11th December—6 months for inrolment.

To John Wisker, of Vauxhall, in the county of Surrey, potter, for his invention of certain improvements in ma-

chinery or apparatus for grinding covers or stoppers for jars, bottles, or other vessels made of China, stone, or other earthenware.—Sealed 11th December—6 months for inrolment.

To Robert Stephenson, the younger, of Saint Mary's Cottage, Downshire Hill, Hampstead, in the county of Middlesex, civil engineer, for his invention of an improvement in the mode of supporting the iron rails for edge railways.—Sealed 11th December—6 months for inrolment.

To Lemuel Wellman Wright, of the London-road, in the parish of St. George's, Southwark, in the county of Surrey, engineer, for a certain improvement, or certain improvements in the combination and arrangement of machinery or apparatus whereby certain well known agents may be employed in producing power, and in the mode of effecting the same, applicable to various useful purposes.—Sealed 16th December—6 months for inrolment.

To Thomas Sunderland, of Blackheath, in the county of Kent, Esq., for his invention of certain improvements in propelling vessels.—Sealed 19th December—6 months for inrolment.

To Charles Chubb, of St. Paul's-Churchyard, in the city of London, patent detector lock manufacturer, and Ebenezer Hunter, of Wolverhampton, in the county of Stafford, locksmith, for their invention of certain improvements in locks used for fastening and security.—Sealed 20th December—6 months for inrolment.

To David Rowland, of Crawford-street, in the parish of St. Mary-le-bone, in the county of Middlesex, mechanic,

for his invention of an improvement in the manufacture of sextants, quadrants, circles, and other instruments used in taking observations and surveys.—Sealed 20th December—2 onths for inrolment.

To Louis Quaintin, of Sabloniere Hotel, Leicester-square, in the county of Middlesex, carriage builder, for certain improvements in the construction of carriages.—Sealed 20th December—6 months for inrolment.

To James Hamilton, of Threadneedle-street, in the city of London, civil engineer, for certain improvements in machinery for sawing, boring, and manufacturing wood, applicable to various purposes.—Sealed 20th December—6 months for inrolment.

To Thomas Earl of Dundonald, of Regent's Park, in the county of Middlesex, for his invention of certain improvements in the construction and operation of rotary engines and apparatus connected therewith.—Sealed 20th December—6 months for inrolment.

To Josiah Gilbert Pierson, of New York, in the United States of North America, but now residing in Ludgate-hill, in the city of London, merchant, for certain improvements in the construction of bolts and latches to be attached to doors and other situations where a secure fastening may be required.—Sealed 20th December—6 months for inrolment.

To John Paul Newmann, of Cornhill, in the city of London, merchant, for certain improvements in making or producing leather from hides and skins, being a communication from a foreigner residing abroad.—Sealed 21st December—6 months for inrolment.

To John Howard Kyan, of Upper Baker-street, in the county of Middlesex, Esq., for a new combination of machinery to be applied to the present purposes of steam navigation, in aid of, and in substitution for, the motive power hitherto and at present obtained, and afforded by the application of steam.—Sealed 21st December—6 months for inrolment.

To George Dickinson, of Buchland, near Dover, in the county of Kent, paper maker, for an improvement or improvements applicable to making of paper.—Sealed 28th December—6 months for inrolment.

EXTRAORDINARY METEORIC APPEARANCE.

Extract from a Letter dated New York, 14th Nov., 1833.

"The heavens presented a most splendid appearance yesterday morning a little before daylight, and exhibited a phenomenon which we never before witnessed to such an extent. Millions of falling meteors were seen in every stage of declination, filling the atmosphere with their brilliancy, and commingling their beauties with the bright studs of the azure vault; producing this indescribable appearance in shooting off the meteoric stones, which assumed the character of an artificial gold rain, differing from it only in its duration, and the brightness of the fiery bodies. The spectacle was one of such surpassing splendour, that its contemplation would have been worth a voyage across the Atlantic."

CELESTIAL PHENOMENA, for January, 1834.

D.	H.	M.	
1			Clock before the ☉ 3 m. 49s.
—			☽ passes the mer. 17h. 48m.
1	23	47	☽ in conj. with ♄ diff. of dec. 8. 8. S.
2	4	12	☽ in □ or last quarter.
5			Clock before the ☉ 5m. 40s.
—			☽ passes the mer. 21h. 3m.
6			Occul. Scorpii im. 18h. 4m. em. 18h. 56m.
	8	42	♃'s first sat. will emerge.
7	17	23	☿ in conj. with the ☽ diff of dec. 0. 21. S.
	17	59	♂ in conj. with the ☽ diff. of dec. 1. 18. S.
8	5	29	☿ in conj. with ♂ diff. of dec. 0. 55. N.
	6	17	♀ in conj. with the ☽ diff. of dec. 0. 10. S.
	12	39	♀ in descending node.
9			☉ eclipsed, invisible.
	11	30	Ecliptic conj. or ● new moon.
10			Clock before the ☉ 7m. 49s
—			☽ passes the mer. 0h. 36m.
11	6	0	☿ in the descending node.
	22	33	♅ in conj. with the ☽ diff. of dec. 8. 7. N.
12			Mer. R. A. 18 h. 13 m. dec. 23. 31. S.
—			Ven. R. A. 18h. 37 m. dec. 23. 19. S.
—			Mars R. A. 18 h. 2 m. dec. 24. 1. S.
—			Vesta R. A. 22 h. 1 m. dec. 17. 0. S.
—			Juno R. A. 17 h. 57 m. dec. 13. 18. S.
—			Pallas R. A. 9 h. 0 m. dec. 26. 13. S.
—			Ceres R. A. 10 h. 42 m. dec. 22. 30. N.
—			Jup. R. A. 1 h. 40 m. dec. 9. 7. N.
—			Sat. R. A. 12 h. 43 m. dec. 2. 0. S.
—			Georg. R. A. 21 h. 34 m. dec. 15. 13. S.
13	10	38	♃'s first sat. will emerge.
14	6	28	♃'s second sat. will emerge.
	18	0	☽ in apogee.
15			Clock before the ☉ 9 m. 43 s.
—			☽ passes the mer. 4h. 24 m.
	5	7	♃'s first sat. will emerge.
—			☿ passes the mer. 22h. 56m.
16	1		♀ in conj. with o in Sagitt. diff. of dec. 1. 47. N.
	16		♂ in conj. with λ in Sagitt. diff. of dec. 1. 30. S.
	22	9	♃ in quad with the ☉
17	10	30	♃ in conj. with the ☽ diff. of dec. 4. 3. N.
	14	42	☽ in □ or first quarter.
19	8	34	♄ stationary.
20			Clock before the ☉ 11 m. 21s.
—			☽ passes the mer. 3 h. 1 m.
—			Occul. Tauri im. 6h. 25m. em. 7h. 42m.
—			♀ passes the mer.
21	9	16	☿ in aphelion.
—			Occul. *l.* in Tauri im. 9h. 30m. em. 10h. 22m.
22			Occul. Q. 2. in Tauri im. 7h. 4m. em. 7h. 51m.
	7	3	♃'s first sat. will em.
24	22	12	Ecliptic oppo. or ○ full moon
—			Occul. η in Cancri im. 19h. 14m. em. 20h. im.
25			Clock before the ☉ 12m. 39s.
—			☽ passes the mer. 12 h. 51 m.
—			♂ passes the mer. 22h. 27m.
26	16		☽ in perigee.
—			♂ in conj. with o in Sagitt. diff. of dec. 1. 37. N.
—			Mer. R. A. 19 h. 58 m. dec. 22. 24. S.
—			Ven. R. A. 20 h. 4 m. dec. 21. 10. S.
—			Mars R. A. 18 h. 55 m. dec. 23. 35. S
—			Vesta R. A. 22 h. 31 m. dec. 14. 20. S.
—			Juno R. A. 18 h. 20 m. dec. 12. 54. S
—			Pallas R. A. 8 h. 49 m. dec. 23. 31. S.
—			Ceres R. A. 10 h. 36 m. dec. 24. 32. N.
—			Jup. R. A. 1 h. 46 m. dec. 9 46. N.
—			Sat. R. A. 12 h. 48 m. dec. 1. 56. S.
—			Georg. R. A. 21 h. 37 m. dec. 14 55. S.
	8	50	♃'s third sat. will im.
	9	30	♃'s second sat. will im.
29	6	39	♄ in conj. with the ☽ diff. of dec. 2. 54. N.
	8	59	♃'s first sat. will emerge
30			Occul 94 Virginis im. 16h. 41m. em.
—			Clock before the ☉ 13m. 37s.
—			☽ passes the mer. 17h. 19m.
31	13	14	☽ in □ or last quarter.
	16	32	☿ in conj. with ♀ diff. of dec. 1. 4. S.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR NOVEMBER AND DECEMBER, 1838.

1833.	Thermo.		Barometer.		Rain in inches.	1838.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low.			Hig.	Low	Hig.	L	
Nov.						Dec.					
26	40	23	29,89	29,77		11	43	36	29,51	29,50	
27	43	32	29,60	29,50		12	44	35	29,67	29,57	
28	43	33	29,41	29,20		13	41	31	29,84	29,74	
29	45	39	29,14	28,94	,65	14	47	36	30,04	29,95	
30	44	33	29,46	29,28	,05	15	49	39	29,98	29,91	
Dec.											
1	51	37	29,80	29,60		16	56	42	29,73	29,42	,025
2	47	39	30,04	Stat.	,05	17	53	48	29,37	29,30	,15
3	49	41	29,97	29,85		18	56	49	29,67	29,26	,025
4	55	45	29,64	29,59		19	56	43	29,71	29,57	,15
5	51	44	29,48	29,40	,025	20	50	47	29,47	29,37	,1
6	49	35	29,46	29,34		21	40	34	29,27	29,24	,675
7	53	38	29,28	29,24	,15	22	49	43	29,26	29,24	,1
8	49	41	29,78	29,75	,05	23	47	42	29,36	29,23	,125
9	57	43	29,54	29,51	,225	24	50	40	29,36	29,27	1 in.
10	54	39	29,79	29,55	,05	25	49	39	29,82	29,28	,425

The great quantity of rain which has fallen during the last week, has caused the floods to be much higher than usual.

Edmonton.

CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

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[CONJOINED SERIES.]

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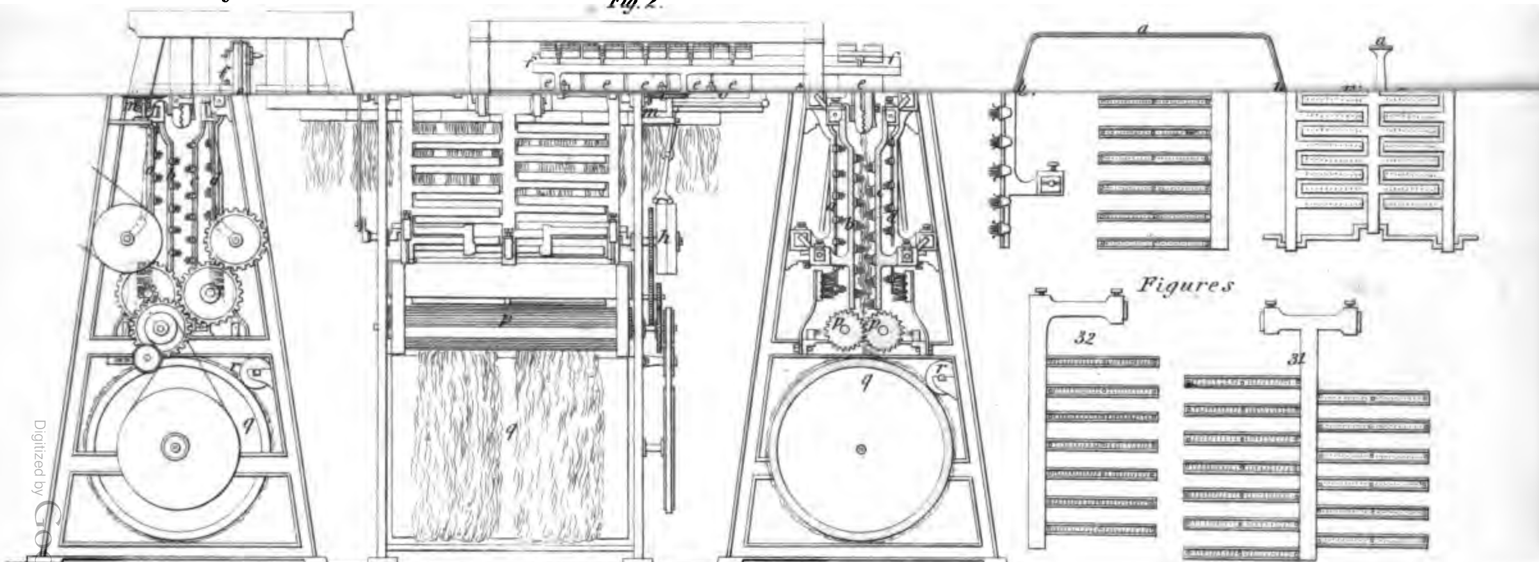
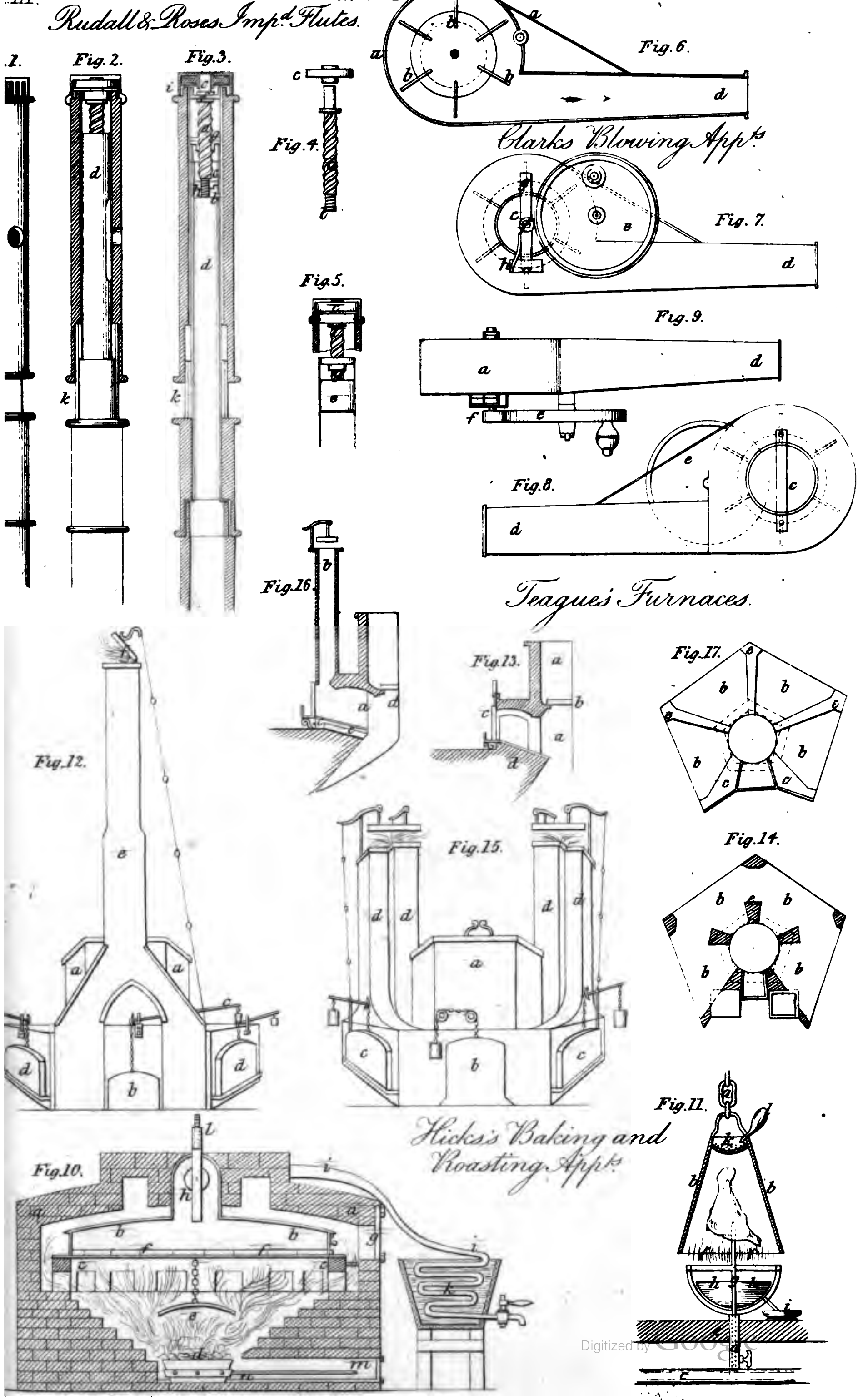


W. Newton del.

1st August 1833.

T. Phillibrown sc.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Hicks's Baking and Roasting Appts
Fig. 10.

Wordsworth Impd Roving Machinery

Fig. 1.

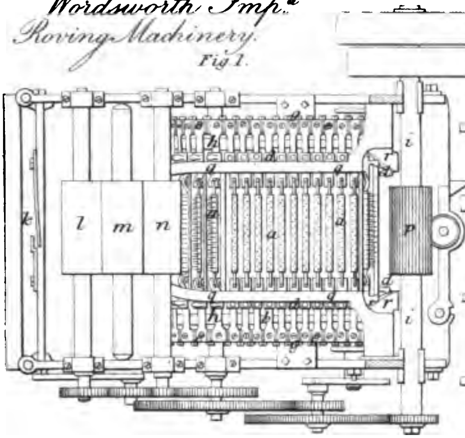


Fig. 4. Fig. 5 Fig. 6 Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11.

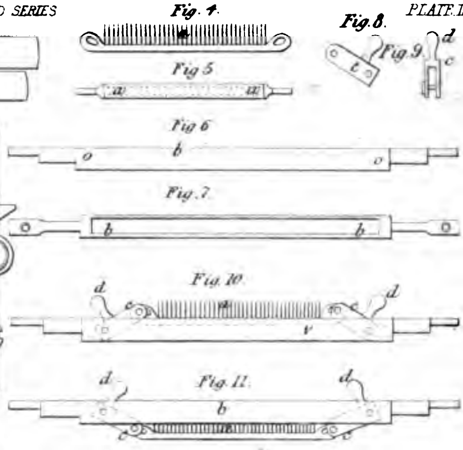


Fig. 2.

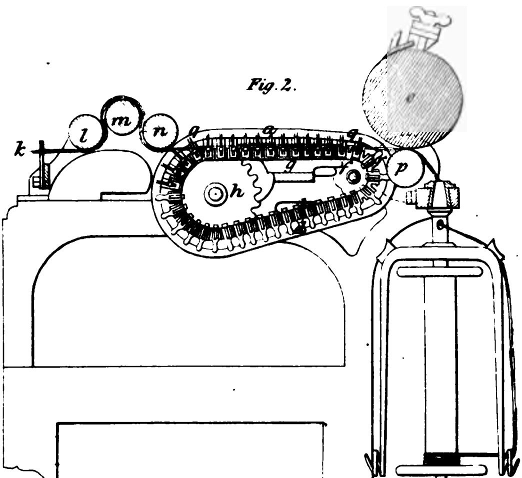
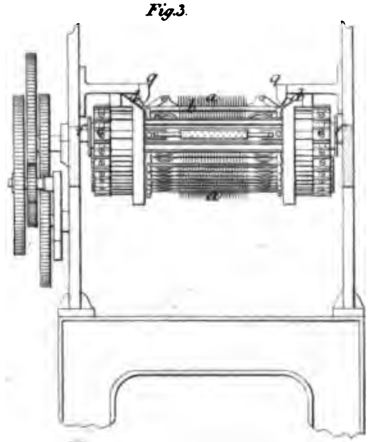


Fig. 3.



Saxton's Impts in Propelling.

Fig. 12.

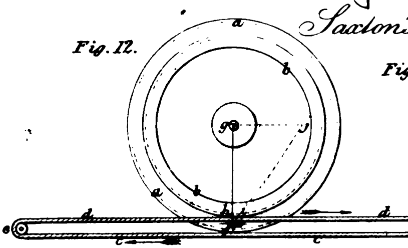


Fig. 14.

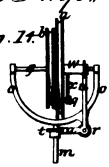
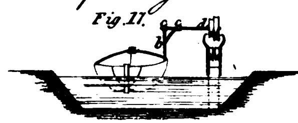


Fig. 17.



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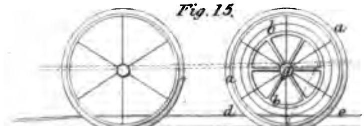

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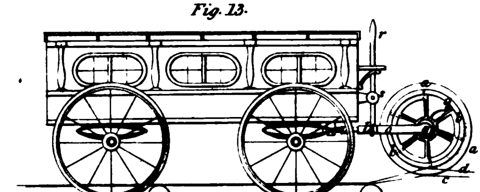

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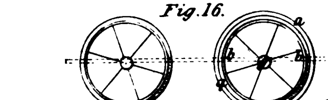
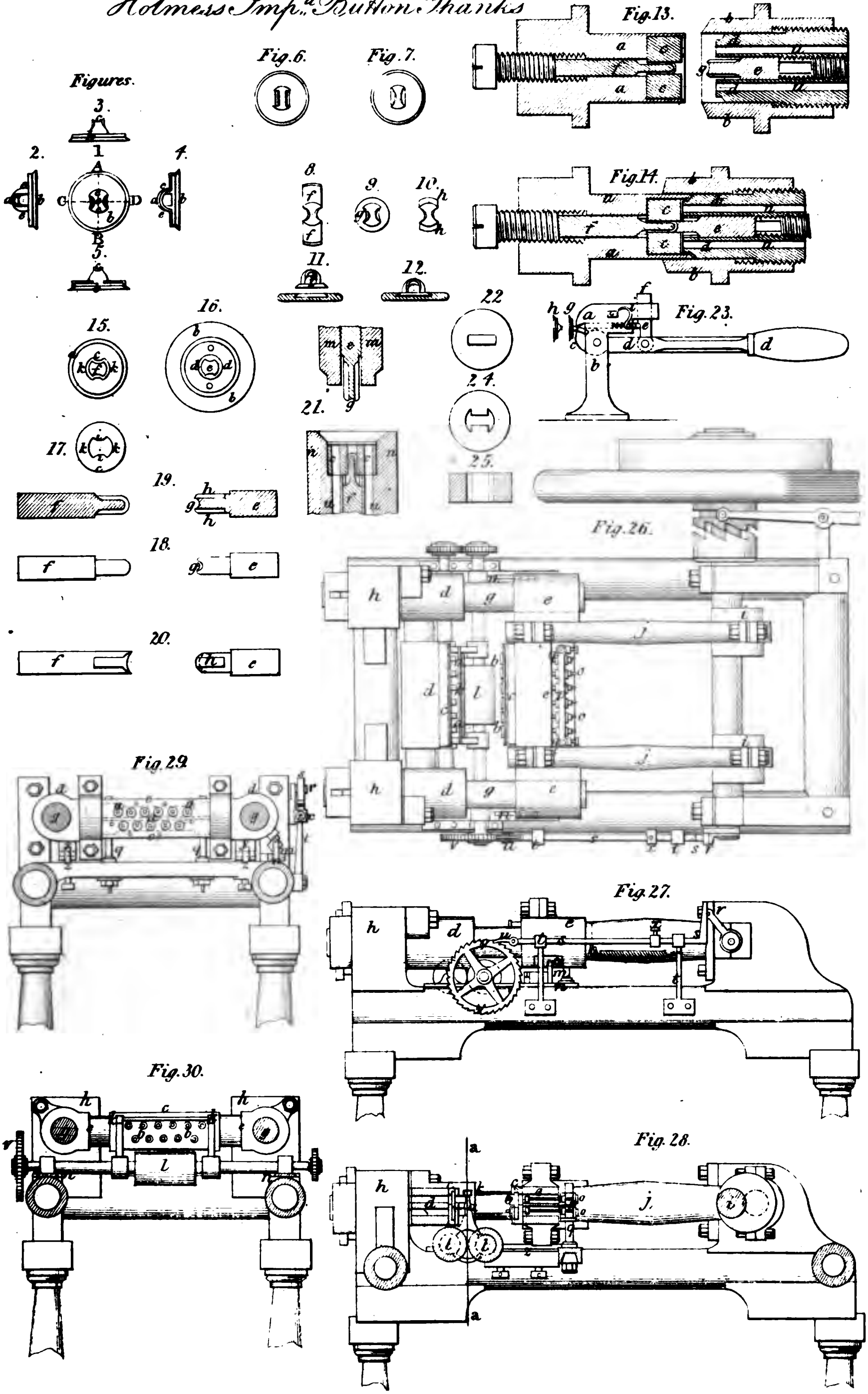


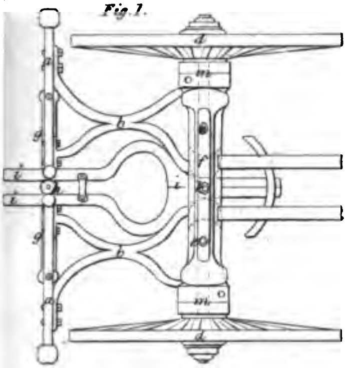
W. Newton, delt. Sepr 1st 1833. J. Philbrown Sc.

Holmes's Impd. Button Shanks



Reedhead's Imp.d Carriage

Fig. 1.



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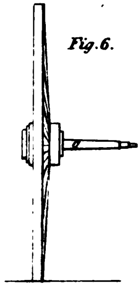

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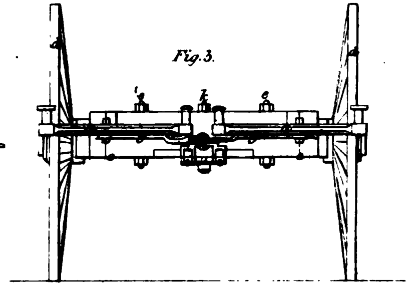

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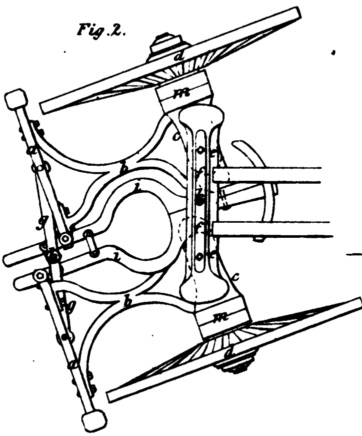

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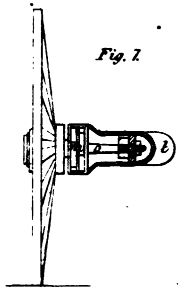

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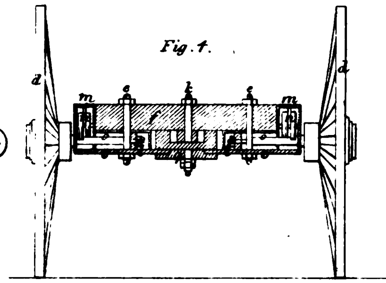

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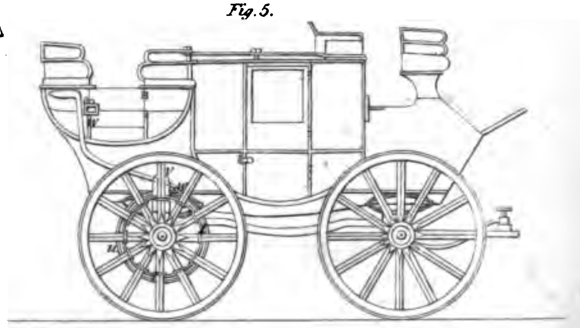
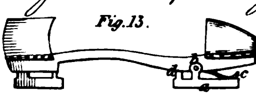


Myatt's Imp.d Clogs

Fig. 13.



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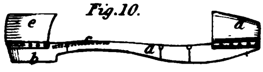

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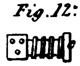

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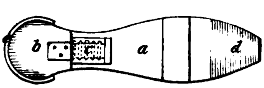
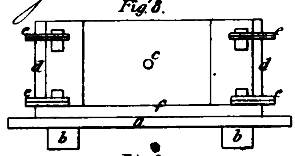


Ranger's Imp.ts in Cement

Fig. 8.



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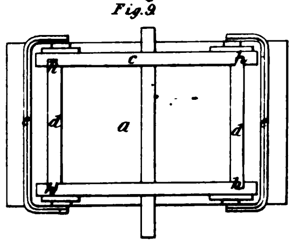
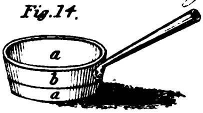


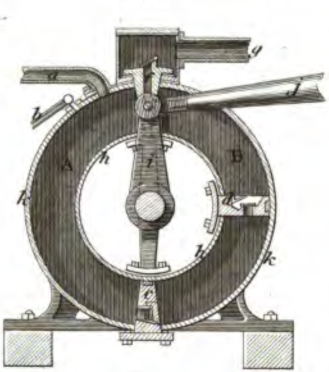
Bancks's Imp.ts in Culinary Utensils

Fig. 14.



Thompson's Imp.d Steam Engine

Fig. 5.



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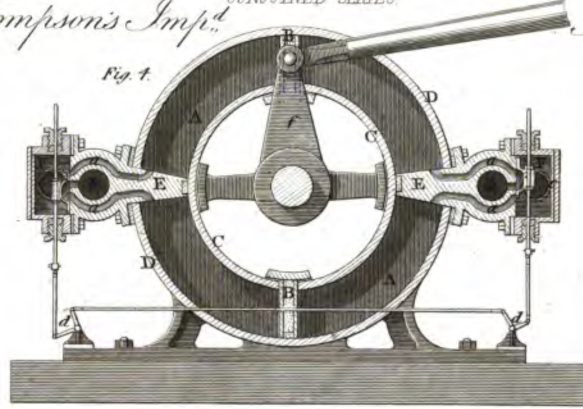

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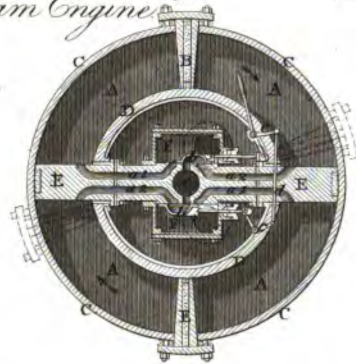

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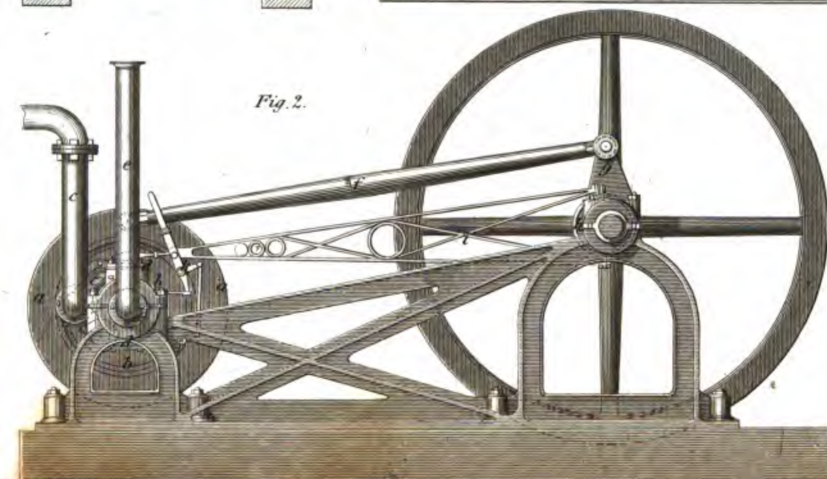
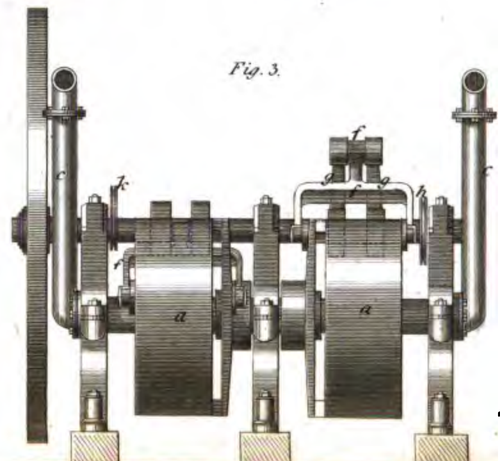
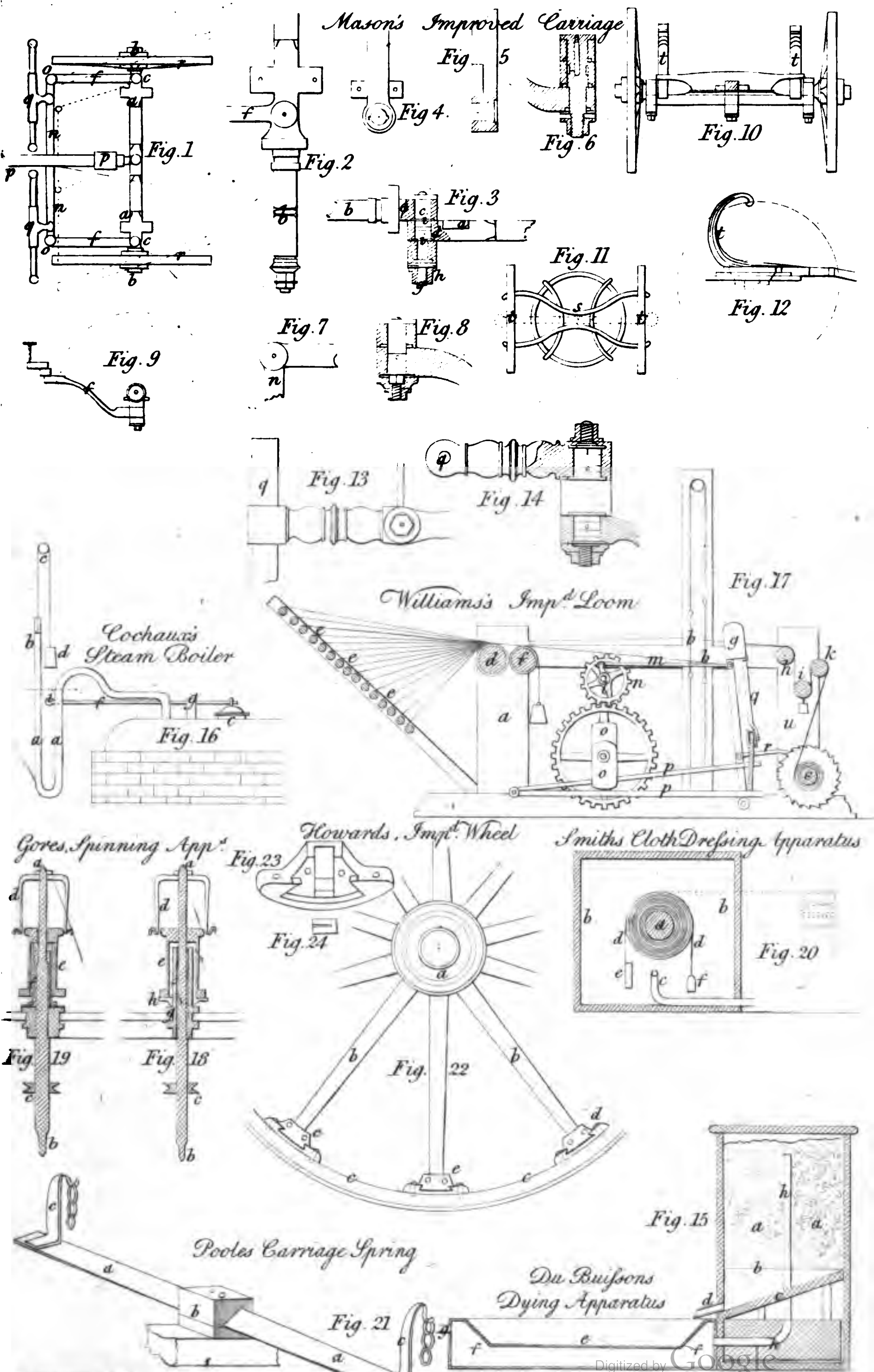


Fig. 3.

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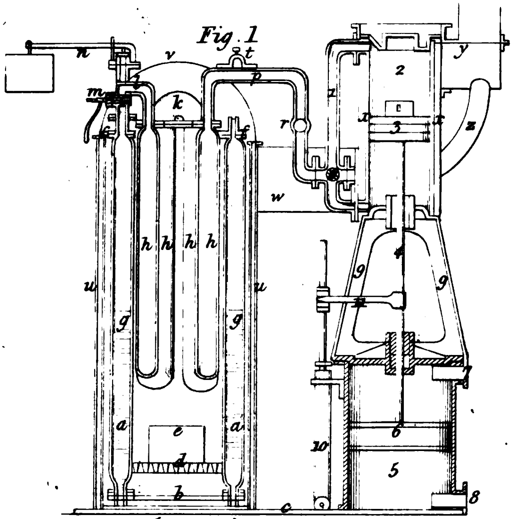

Trevithick's Steam Engine

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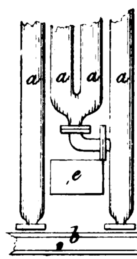
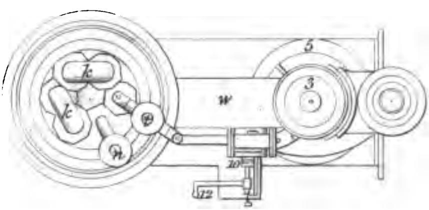


Fig. 2



Ingrams Button Press

Fig. 6

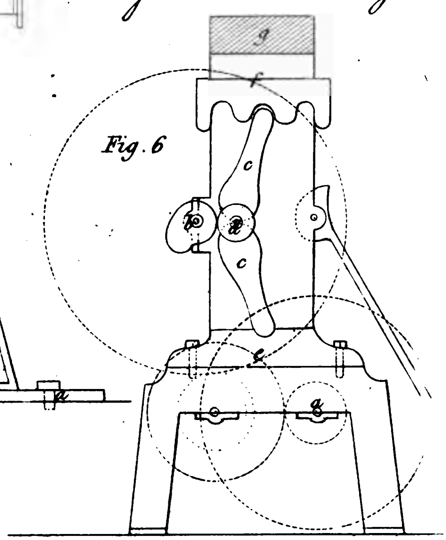
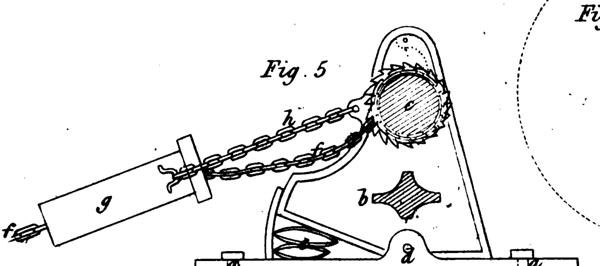


Fig. 5



Scott's Impd. Windlass

W. Newton, delt. 1 Oct. 1833. F. Mansell, sculpt.

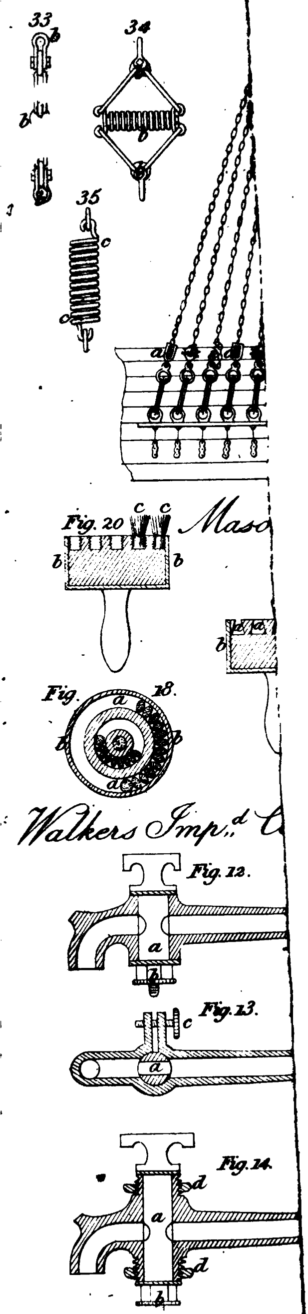
VOL.II

W. New

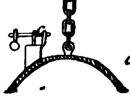
Newton Del.t

III.

Heathorn



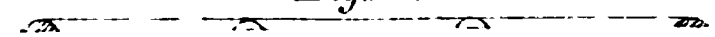
Newton Delt.



Garnett's Sugar Apparatus

Ruthven's Propelling Apparatus

Fig. 15.



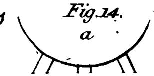
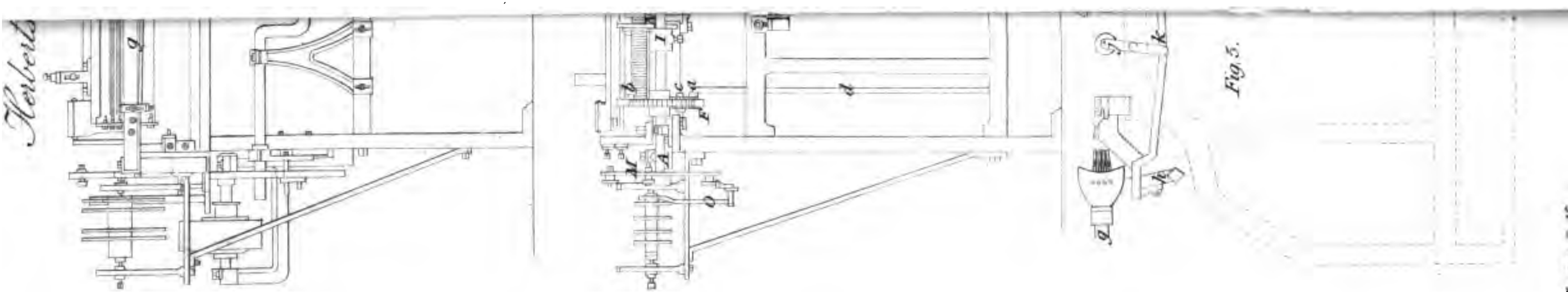
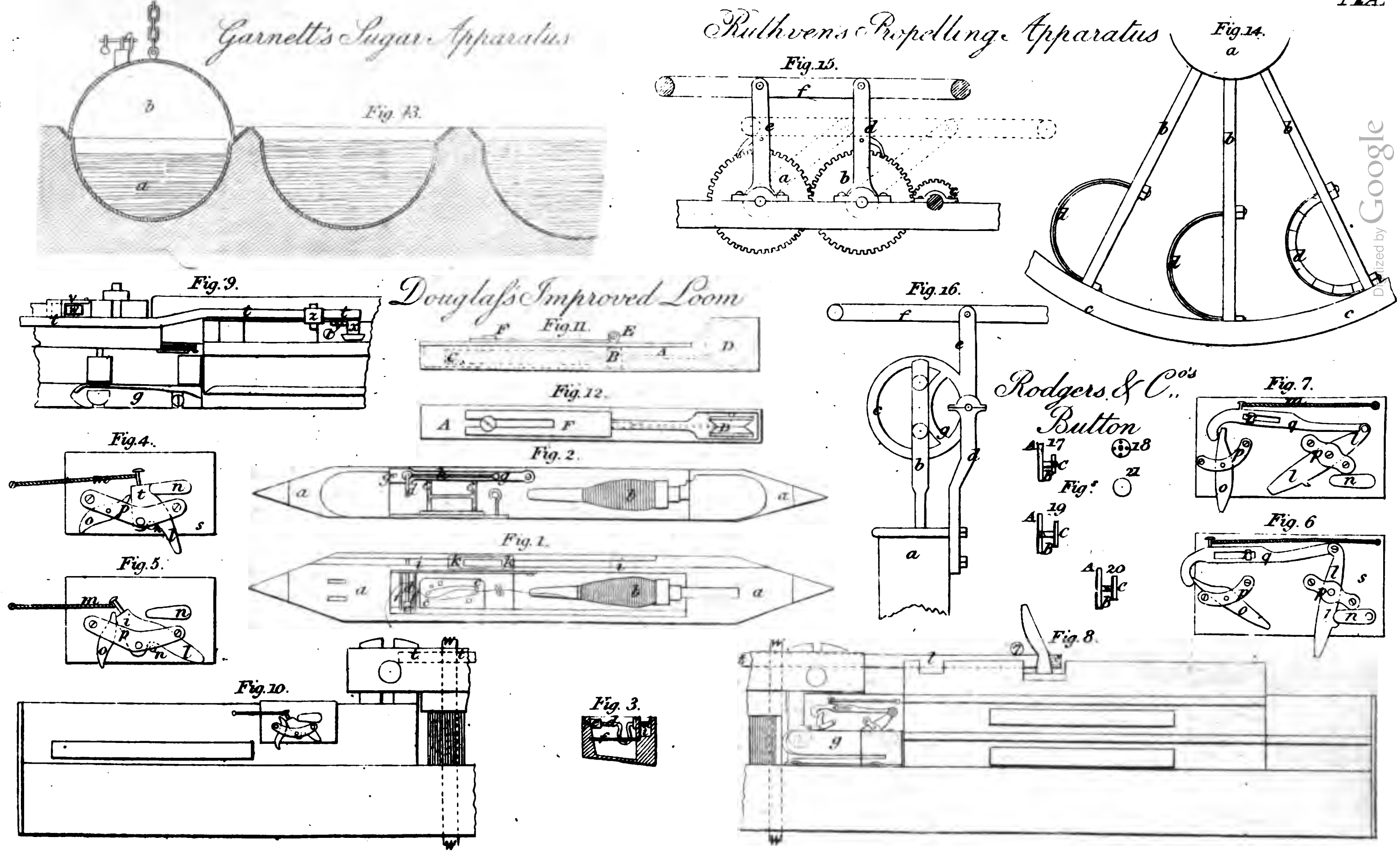


Fig. 14.



W. Newton Del.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Ruthven's Propelling Apparatus
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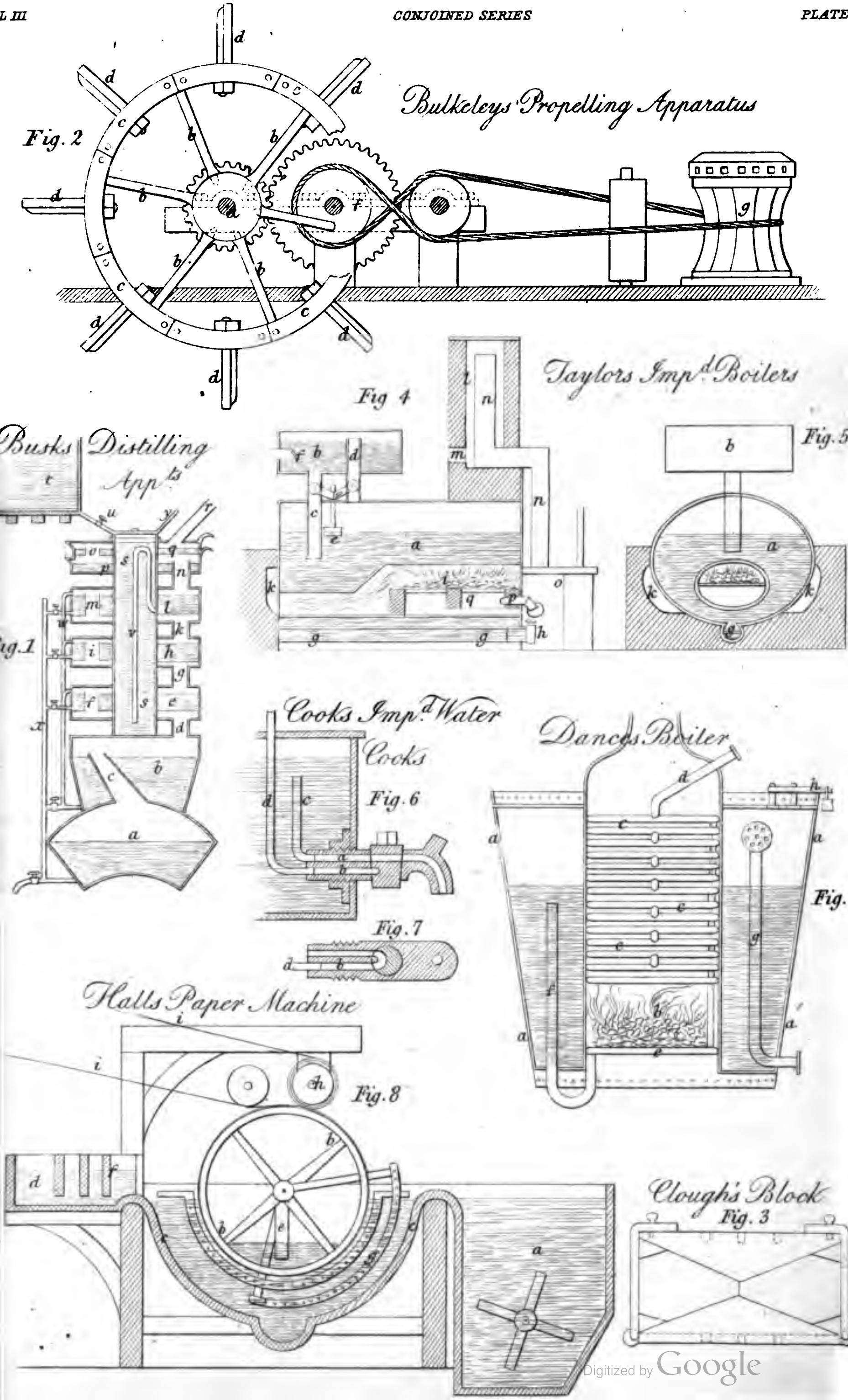
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Taylors Impd Boilers
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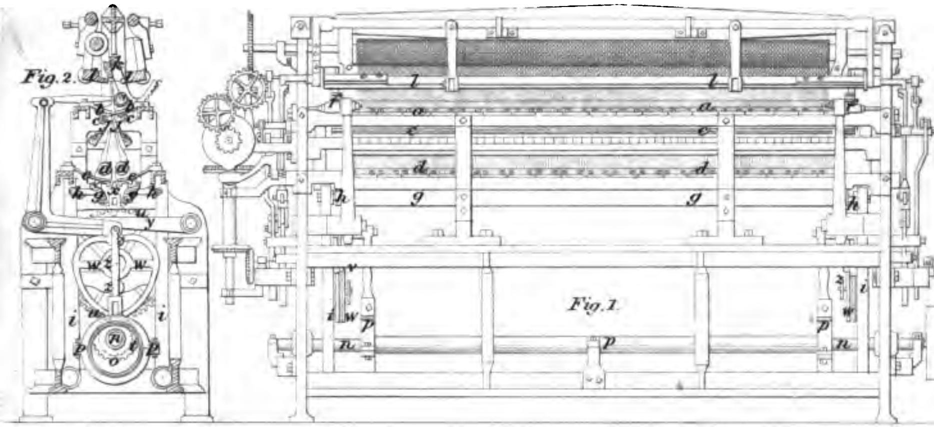
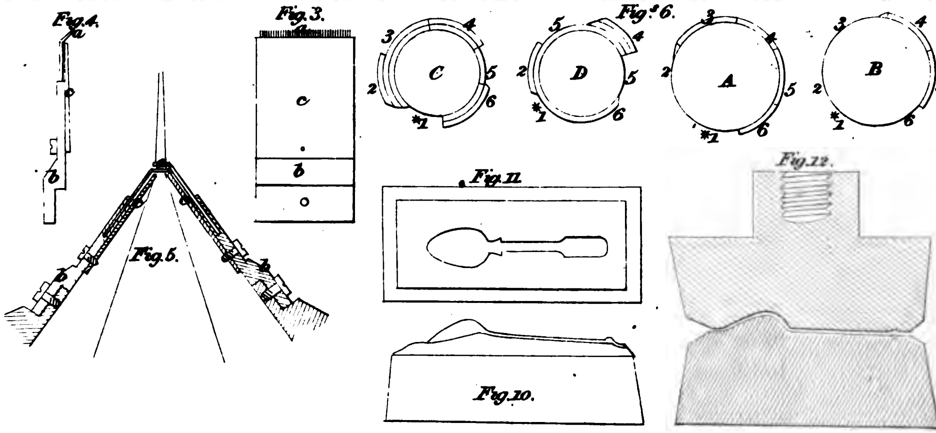
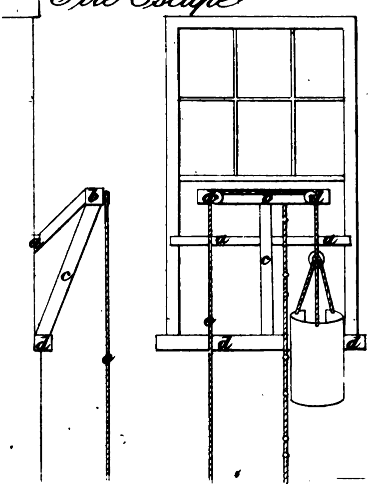
Fig. 5
Busks Distilling Appts
Fig. 1
Cooks Impd Water Cocks
Fig. 6
Fig. 7
Dances Boiler
Fig. 9
Halls Paper Machine
Fig. 8
Cloughs Block
Fig. 3

Henson's Lace Machine

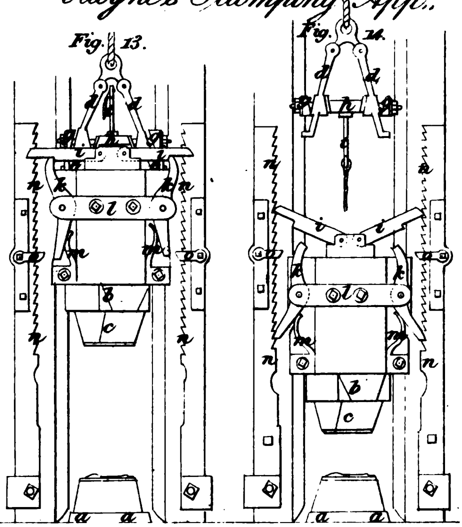




Walkers Fire Escape



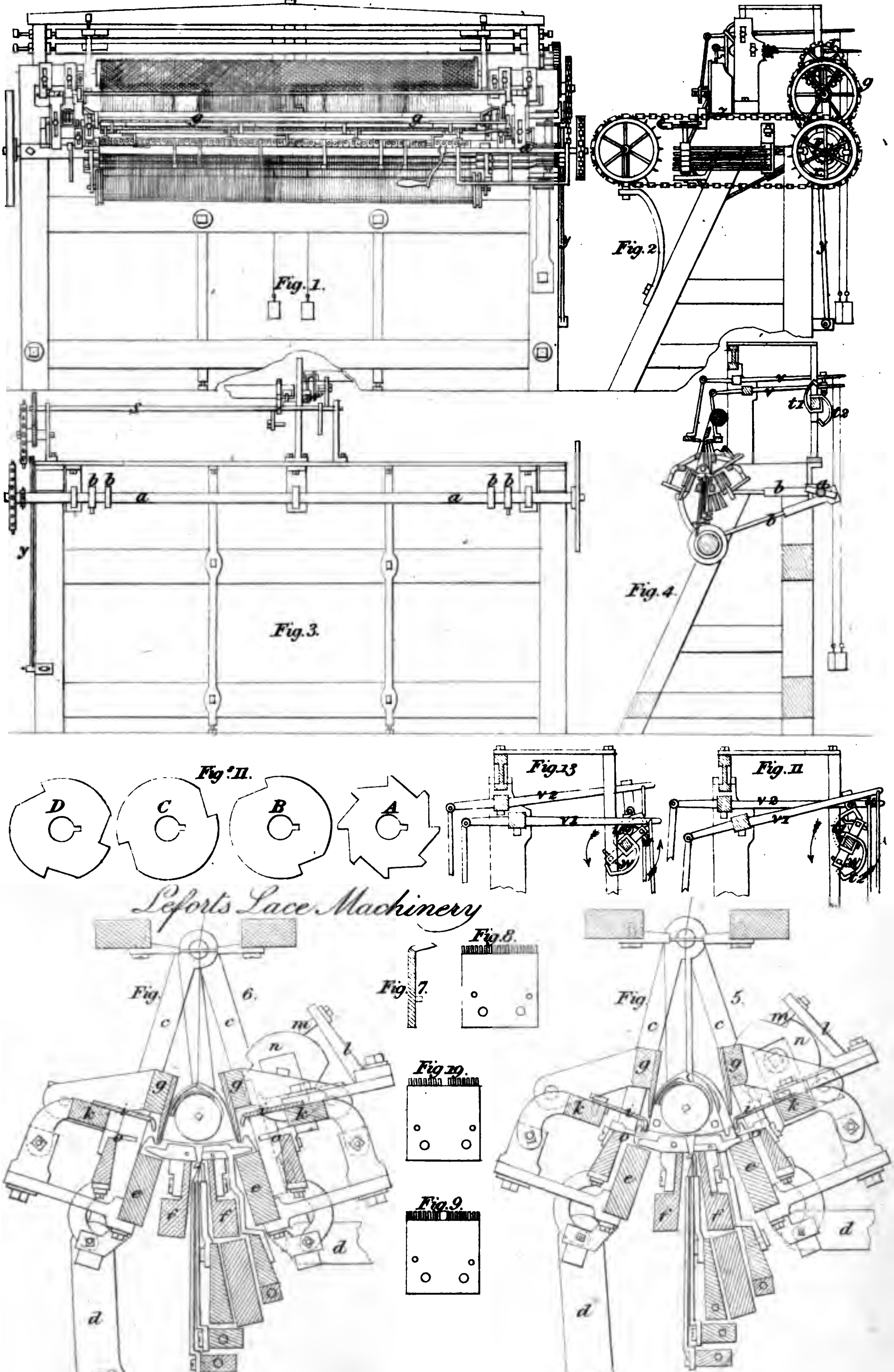
Hayne's Stamping App.ts



W. Newton Del.t

1. Jan. 1834.

T. Phillibrown Scu...



Leforts Lace Machinery

W. Newton Del^t. 1 Jan 1834. T. Phillibrown Scu